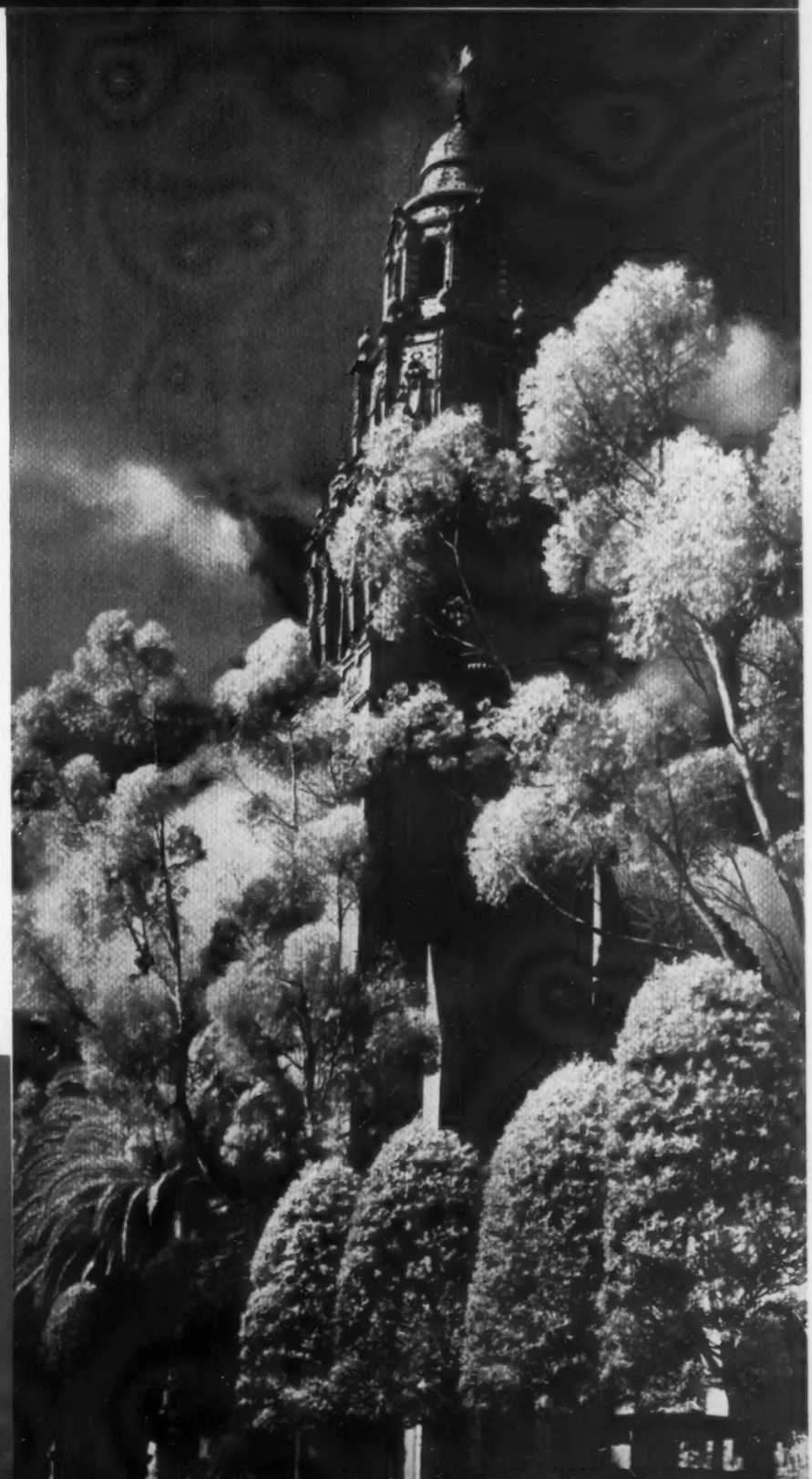
ELECTRICAL WEST



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An Exposition of Better Living

SAN DIEGO, 1935

Electricity, at the San Diego Exposition, shall be painter upon the canvas of night . . . silent servant in the modern home. Since 1915, at its previous fair, the semi-tropical gardens of Balboa Park have been growing luxuriantly. Its beautiful buildings have merged into their foliage. Here will be the most perfect scene for the artistry of light . . . Chicago may have exemplified a mechanistic future. San Diego will show better living today . . . in which electricity plays so versatile, so invaluable a part.

Y 1935

McGRAW-HILL CO. OF CALIF.
PRICE 25 CENTS PER COPY

The great genius of electrical mathematics displayed real business acumen when he asserted that "competition is dead, and that co-operation is the word."

The manifold parts of the electrical industry are so essentially interdependent that co-operation is imperative. The manufacturers of and dealers in electrical equipment are helpless without the vitalizing energy of the utility company, and the utility company can sell no power without the devices that use it.

Joint action by manufacturers, dealers, contractors and the Southern California Edison Company has resulted in a program of intensive merchandising that should make this the record year of all times . . . . Co-operation is the word.

SOUTHERN CALIFORNIA EDISON COMPANY LTD.

Edison

5-35

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ELECTRICAL WEST

With which are consolidated the "Electrical Journal," the "Journal of Electricity, Power and Gas," and the Journal of Electricity."

ESTABLISHED 1887

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• The most enlightening event during the past month was the highly successful Pacific Coast Electrical Association meeting at Fresno where over 250 men and women gathered to hear the winning papers from the 726 contestants in the P.C.E.A. problem paper contest. When over 30 per cent of an association's membership participates in an activity there is good reason to believe that there is a great need for, and great results to be derived from, cooperative effort. Prize winning papers will be published in the June Convention-In-Print issue of ELECTRICAL WEST. The names of the prize winners and of *all* participants will be found in this issue. Is your name there?

• Many readers have asked that ELECTRICAL WEST institute a Question and Answer Department. The editors think that is an excellent idea and take this opportunity of announcing that it will start with the July issue. All questions regarding any phase of the electrical industry whether they be technical, commercial, legal, operating, construction or theoretical can be submitted to ELECTRICAL WEST. The editors may not know the answer but they do know somebody who does. Questions with the answers will be published as soon as possible after they are received. Questions will be identified only by the initials of the person who submits them so don't be bashful about asking for the answer to *your* problem.

• Somehow both Electra's Husband and Bill Jones got to discussing politics this month. You'll enjoy their comments and ponder a long time over some of the philosophy embodied in thoughts of these two progressive members of our industry. By the way, one of ELECTRICAL WEST's readers gently chides Bill in an interesting letter (the first Bill has received) which is reproduced on page 25. Why not write to him yourself? Maybe we can get up a debate.

NEXT MONTH

• The electrical industry presents to its members the 3rd Annual Convention-In-Print. With due regard for modesty, we feel that it will be one of the most valuable and helpful compilations of facts, figures and discussion on the problems of the industry that has ever been put in print. This because the June issue will represent a crossection of thought and opinion of almost 1,000 men and women in the industry. Make a mental note now to study the June issue carefully. It will help you to a better understanding of your job and the job ahead.

Sales Talks that SOLD Appliances

CASE HISTORY No. 5
Selling An Electric
IRONER

BILL SMITH, master salesman, decided that this year he would forestall the summer slump in business with a campaign on some popular fast-moving appliance which would keep the sales curve moving upward. After talking it over with the sales force he decided that the electric ironer would make a fine campaign; first, because he has a large list of washing machine customers who were natural prospects; second, because the ironer is a popularly priced item that makes it easy to sell; and, third, because the inherent advantages of which the ironer can boast permit a strong sales presentation to be made on it. So Bill secured the services of a competent demonstrator of ironing machines through his local wholesaler, laid out a fine floor and window display and then prepared a personal letter to all his customers who owned washing machines inviting them to come to the store and see the demonstrator at work. As a follow-up for the letter, Bill telephoned these prospects and in this way secured a large number of demonstrations. Mrs. Jones, who agreed to come in, has entered the store and asked for Bill.

BILL: "How are you, Mrs. Jones? I am glad you came down to see this labor-saving appliance. After you see how economical it is and how easily and quickly a large ironing can be disposed of, I know you'll be more enthusiastic than ever about electrical servants. Just come this way, please."

¶ Bill leads her to the demonstrator, introduces her and suggests that the demonstrator show Mrs. Jones how the ironer operates by actually ironing a few pieces. (Previously Bill has arranged with the demonstrator for a definite routine that parallels the sales talk.)

BILL: *(as the demonstrator starts to iron a towel)* "You'll notice, Mrs. Jones, that ironing can be performed while seated comfortably before the machine, and you'll be surprised to see how easily everything in the wash can be ironed more quickly and certainly much better than with the old hand iron. You see this heated metal shoe, as we call it, is brought into contact with this roll, which takes the place of ironing board, under almost a hundred pounds' pressure. The roll is free to turn when the shoe is released but once the shoe is brought down on the roll, the roll automatically turns and carries the piece to be ironed under the shoe. It's simple, isn't it?

MRS. JONES: "It looks easy, and I imagine it would be fine for sheets and towels and things like that, but you know we have two children in our family and there is always a large number of dresses and shirts in our laundry, to say nothing of my husband's things, and he's a crank about the way his shirts are done. You can't iron such things with this machine, can you?"

BILL: *(smiling)* "It doesn't seem possible, does it, but watch this. *(Demonstrator picks up shirt and starts to iron)* First the sleeve—then the back—now the front and the yoke, and, finally, the collar. *(He takes the ironed shirt and holds it up for Mrs. Jones' inspection)* Five minutes' time, and I'll wager the most particular man in the world could find no fault with the way it's ironed or the way it looks. Don't you agree?"

MRS. JONES: "It certainly is beautifully done. I had no idea it was so easy. Can you also iron pleats and ruffles as easily?"

BILL: "Certainly. *(He picks up a child's dress with ruffled sleeves and pleated skirt)* Watch this one. With an ironer like this you can be sure those fine youngsters of yours will always appear clean and bright because it takes no time at all to keep freshly ironed dresses and shirts on hand. Wouldn't you like to see for yourself, just how easy ironing has been made by electricity?"

MRS. JONES: "Oh, I couldn't run this. I don't know anything about it."

BILL: "'I appreciate how you feel, but it is really very simple. Now just sit down here. This lever by your knee starts and stops the ironer. First, you lay the piece to be ironed smoothly on the roll, like this—then touch this lever with your knee and away it goes. When it has passed all the way under the shoe—touch the lever again and the

roll stops and the shoe is released all ready for another piece. Try ironing this sheet. *(He folds it and places it on the roll for her and lets her run it through)* Isn't that easy easy? After ironing this way, the old hand method is real drudgery, don't you think?"

MRS. JONES: "Well I never thought that I'd be able to sit down and iron a sheet. It certainly is fast, too."

¶ Bill has used a sound selling principle in demonstrating the device he is telling his prospect about. Notice he shows how it will perform every ironing operation easily and quickly. Then he gets the prospect to try it. Letting your prospect touch, handle or operate a device arouses the possessive instinct—it helps you sell!

BILL: "You're right about that. With this ironer you could do all of the ironing in one-third the time it now takes by hand and without tiring yourself out, too. Lifting a hand iron and pushing it back and forth is real manual labor, as you probably know. And you'll notice that even though you sit down and iron with this ironer, it is built low enough so that you don't have to reach up or over it to do the ironing."

¶ Here Bill feels that he has thoroughly convinced his prospect by demonstrations and by letting her use the ironer herself of three things that are distinct advantages to her, i. e., it is easy to operate, much faster than her present method, and gives a far better appearing finish to the ironing. But before asking for a decision from his prospect he wants to explain additional advantages so that when he does ask for the order the prospect will have more advantages to weigh against its cost.

BILL: "The best thing about this new labor-saving convenience is its economy. Not only does it save current over the old hand ironing method because, even though it uses slightly more electricity, it operates only one-third as long, which really saves you money. Most women who haven't yet taken advantage of this modern convenience probably send a number of larger pieces to the laundry each week. After all, life is too short to stand for hours ironing sheets, heavy spreads and shirts. Don't you think so?"

MRS. JONES: "Well, I know at our house we do have quite a laundry bill. I just can't do my husband's shirts up the way he wants without spending hours over the ironing board."

BILL: "With this fine appliance I know that you can do all of the family laundry in less time than it now takes you to iron a few pieces. You can cut housekeeping costs by eliminating the laundry bill and using the savings thus made to buy those extra little items for yourself and the family. Furthermore, home laundry really lengthens the life of your clothes. All things considered, this ironer is one of the best investments that can be made for the home."

MRS. JONES: *(doubtfully)* "I would like to have it, but there are so many other things we want that I don't know that I ought to spend the money right now."

BILL: "I appreciate how you feel about that, Mrs. Jones. We all want to spend our money wisely these days and this ironer is really a splendid aid to more comfortable living. You really can't appreciate how much it simplifies housekeeping until you've had it in your home a few weeks and you'll never miss the small budget payments necessary to place it there. Let me send it out tomorrow. With your present washing machine and this new ironer you will have a completely electrified home laundry that will save you money and give you much more leisure time."

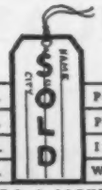
MRS. JONES: "Do you really think that I could learn to operate this so I could do all of the family laundry?"

BILL: *(enthusiastically)* "I'm sure of it because our demonstrator here will teach you to operate the ironer to your satisfaction. After two or three lessons you could be ironing the most complicated dresses imaginable. If I remember rightly, this model will match the washing machine I sold you some time ago. May I send it out tomorrow?"

MRS. JONES: *(decisively)* "Yes, I believe I'll take it. I don't know what my husband will say about this added expense but I think I can stretch my housekeeping budget to cover the necessary payments."

BILL: "I'm sure we can fix it up to your satisfaction, Mrs. Jones, and I know also that if your husband had to do the ironing by the old hand method he probably would have been out looking for just such an ironer as this one a long time ago. I know you'll be well satisfied with your wise decision."

¶ Ironers are a "natural" for good merchandisers because they demonstrate remarkably well and permit real economy for the user. That makes for a strong sales presentation which will bring an enviable volume of business to aggressive merchandisers.



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MOUNTAIN STATES POWER CO. | PUGET SOUND POWER & LIGHT CO.
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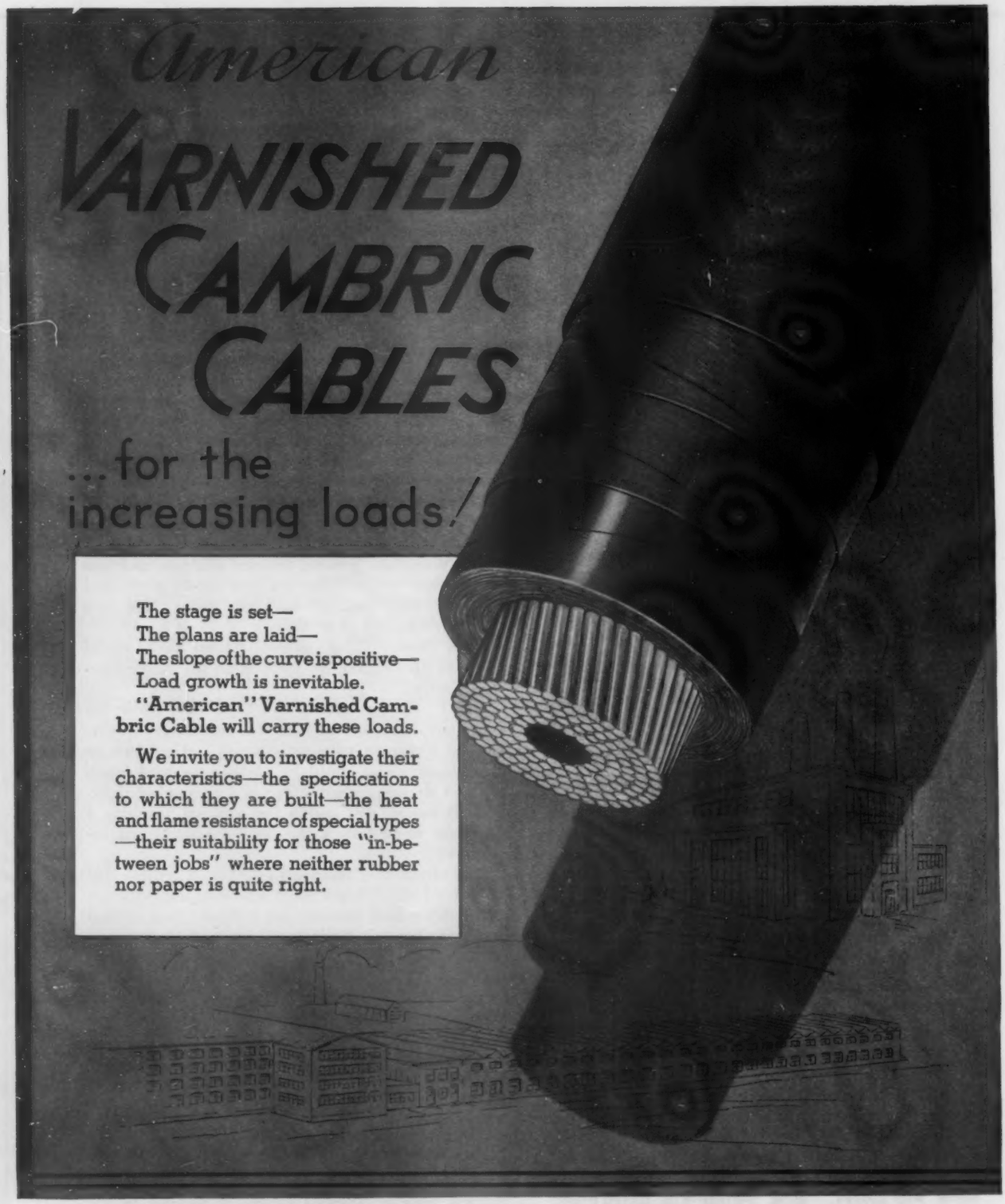

American
VARNISHED CAMBRIC CABLES
...for the increasing loads!
The stage is set—
The plans are laid—
The slope of the curve is positive—
Load growth is inevitable.
"American" Varnished Cambric Cable will carry these loads.
We invite you to investigate their characteristics—the specifications to which they are built—the heat and flame resistance of special types—their suitability for those "in-between jobs" where neither rubber nor paper is quite right.

AMERICAN STEEL & WIRE COMPANY

United States Steel Corporation Subsidiary

Pacific Coast Distributors

COLUMBIA STEEL COMPANY

SAN FRANCISCO LOS ANGELES PORTLAND SEATTLE

Look to Your METERS for MAXIMUM Benefit from "BETTER LIGHT—BETTER SIGHT"

IN the last ten years, you have probably more than doubled your domestic load. Today, it has reached a new peak.

And conditions point to a further increase. "Better Light — Better Sight" and other load-building campaigns are constantly increasing the demand for power.

To obtain maximum benefit from these added loads —look to your meters. They must register accurately.

Consider This Situation

The number of your customers has not gone up in proportion to the increase in power consumed. This means that you have placed greater loads on individual meters.

However, the watthour meter of 1915—or even 1925 —was not designed for such loads. Under present conditions its use may cause loss of revenue.

The element now used in all G-E single-phase watthour meters. It can be furnished in several different forms of housings

What, then, of the future? Only modern meters can yield the proper returns from most of your residential customers during the coming decade.

The Modern G-E Meters

Eight years ago, General Electric introduced a new line of watthour meters—with the now well-known Type I-16 element. Millions were installed, and their service records testify to their permanent, long-range accuracy.

Today, General Electric offers a line of watthour meters with the same fundamental design, but with added features to fit them to meet new conditions.

They are known as Types I-20-A, I-20-B, I-20-C, and I-20-S. They differ only in the methods of housing to suit the various conditions of installations and to give complete protection.

They have practically straight-line accuracy up to 300-per-cent load—a feature which insures correct registration from light loads to the heavy loads taken by present-day residential consumers.

A Sound Investment

When all factors are considered, a systematic program for the retirement of obsolete watthour meters usually proves a sound investment.

You may want to continue your investigations to determine just what such retirement will mean to your system. In this work our meter specialists will be able materially to assist you. Address the nearest G-E sales office, or General Electric, Schenectady, New York.

GENERAL ELECTRIC

400-11

MINIMIZING *of the* POWER

Power arcs can hardly be prevented—but the resulting damage, especially to your insulators, rests largely upon the material from which those insulators are made.

Your PYREX insulators, of heat resisting glass, will stand the greatest punishment under power arcs without shattering (see illustration). They assure you fewer interruptions in service and greater economy in operation.

Further, because of the transparency of the material, the effect of the power arc is observable from the ground. Many instances are reported where PYREX insulators were not removed from service after being hit by a power arc.

Thermal properties deserve first consideration in your choice of an insulator.

CORNING Laboratories as one of their first achievements in developing heat-resisting glass, produced Pyrex Ovenware which is now in daily use in countless homes.

"PYREX" is a trade-mark and indicates manufacture by

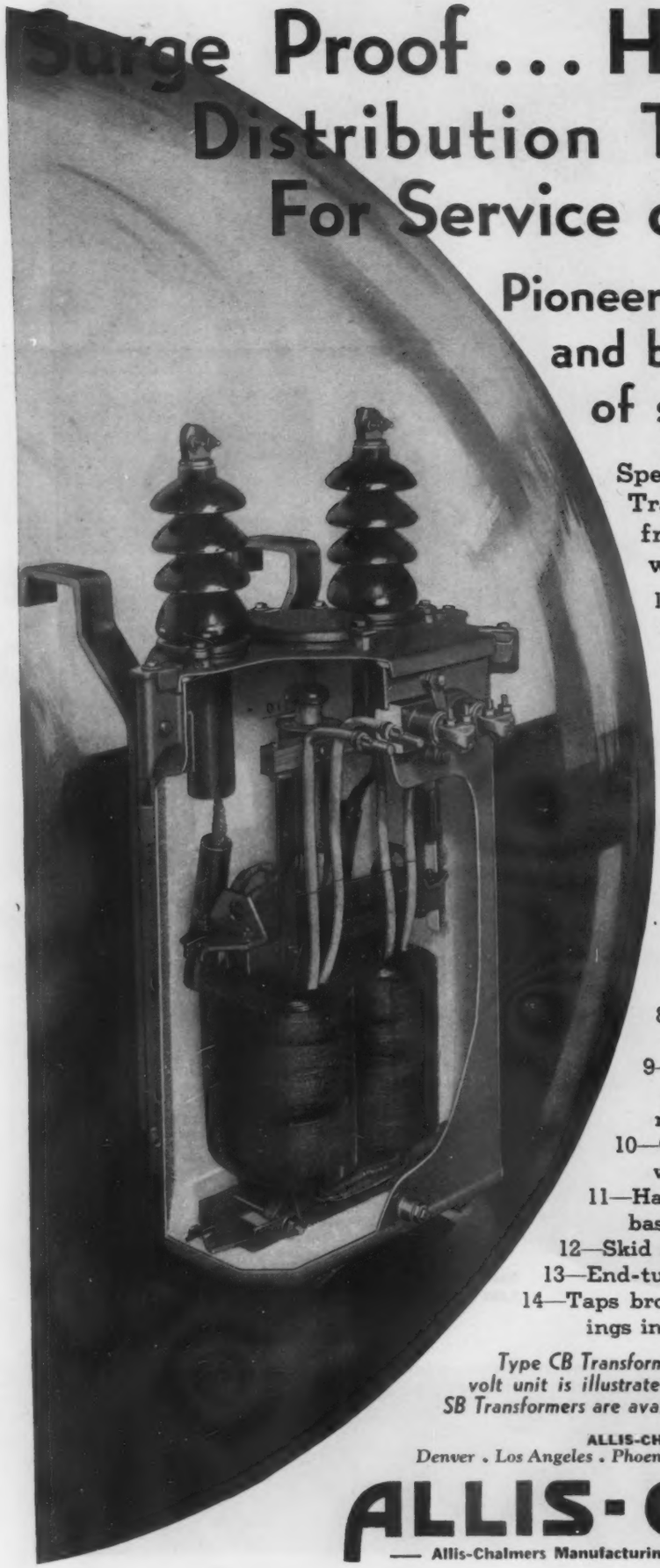
CORNING GLASS WORKS
CORNING, NEW YORK

PYREX

the Power ARC

Result of Power Arc Test,
1,800 Amperes 5 Seconds.

Power Insulators



Surge Proof ... High Voltage Distribution Transformers For Service on Rural Lines

Pioneered by Allis-Chalmers and backed by four years of satisfactory service

Specify Type "CB", Allis-Chalmers Transformers for continuous, trouble-free service. Here are 14 reasons why they are better:—

1—Completely surge-proof.
2—High voltage bushings coordinated, quadruple petticoat type, cover mounted.
3—Totally enclosed, sludge-proof tap changer; easily accessible through hand-hole in cover.
4—Bushing shanks and all internal electrical connections immersed in oil.
5—All leads encased in insulating tubing.
6—All terminals provided with non-corrodible solderless connectors.
7—Coordinated low voltage gang bushing.
8—All bushings easily demountable without removing cover.
9—Transformer of oil-tight construction and shipped completely filled with oil, ready for service.
10—Combination oil drain and sampling valve of non-corrodible material.
11—Hangers not extending below transformer base.
12—Skid angles underneath base.
13—End-turns super-insulated.
14—Taps brought out from the center of the windings insure safety against surges at this point.

Type CB Transformers, of which a 5 kva, 6900/11950Y—115/230 volt unit is illustrated, are available for 6900 volts and above. Type SB Transformers are available for the lower voltages.

ALLIS-CHALMERS WESTERN SALES OFFICES
Denver . Los Angeles . Phoenix . Portland . Salt Lake City . San Francisco . Seattle

ALLIS-CHALMERS

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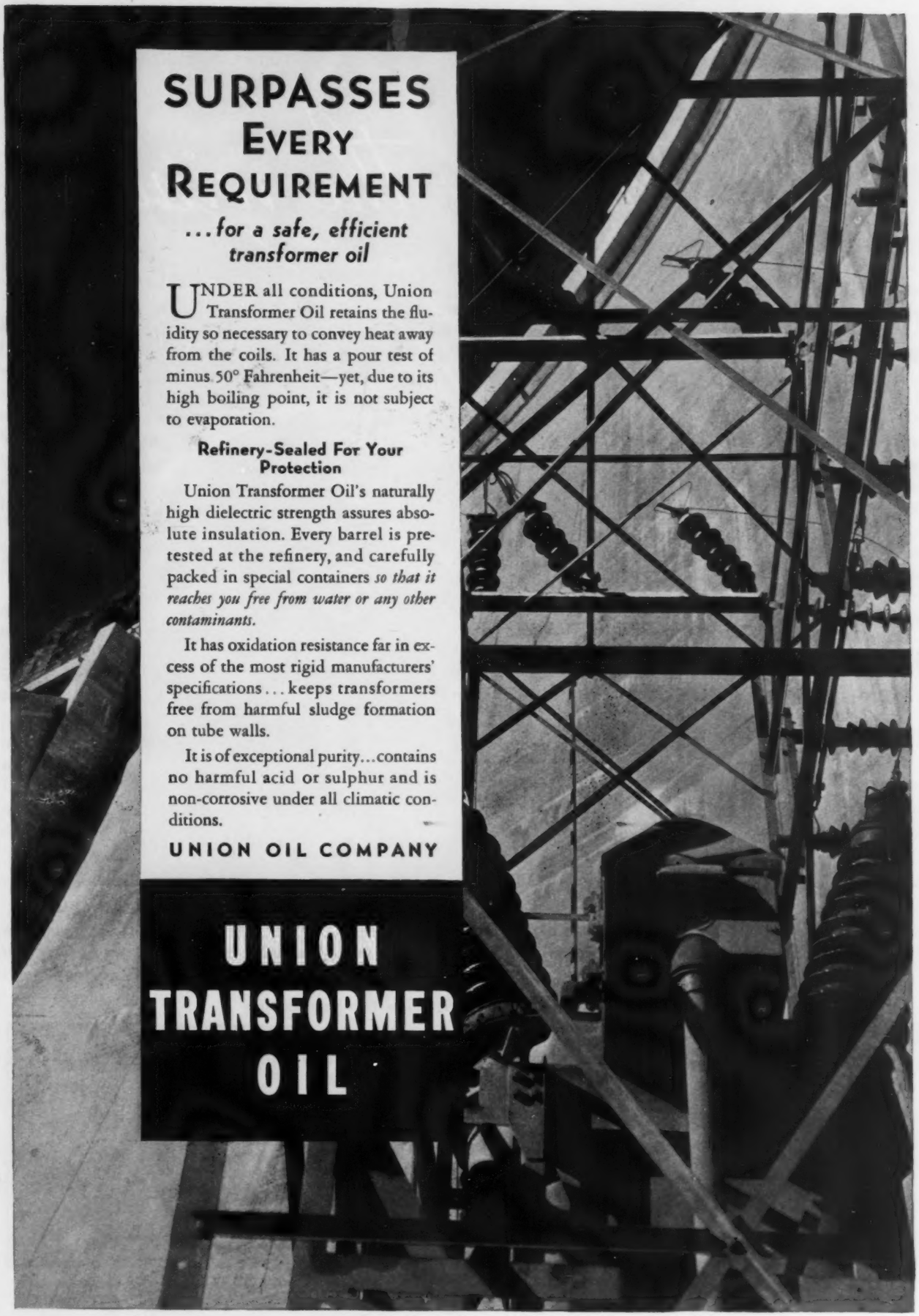

SURPASSES
EVERY
REQUIREMENT
...for a safe, efficient transformer oil
UNDER all conditions, Union Transformer Oil retains the fluidity so necessary to convey heat away from the coils. It has a pour test of minus 50° Fahrenheit—yet, due to its high boiling point, it is not subject to evaporation.
Refinery-Sealed For Your Protection
Union Transformer Oil's naturally high dielectric strength assures absolute insulation. Every barrel is pretested at the refinery, and carefully packed in special containers so that it reaches you free from water or any other contaminants.
It has oxidation resistance far in excess of the most rigid manufacturers' specifications... keeps transformers free from harmful sludge formation on tube walls.
It is of exceptional purity...contains no harmful acid or sulphur and is non-corrosive under all climatic conditions.
UNION OIL COMPANY
UNION
TRANSFORMER
OIL

Reports from major dealers in various parts of the country indicate that they are selling more than twice as many Frigidaires this year as they sold in the same period of 1934. Here is a straw in the wind that clearly indicates the direction of public preference—and the direction in which you should turn for real refrigeration profits in 1935.

Frigidaire '35

THE GENERAL MOTORS REFRIGERATOR

Bigger and *Better* Range Sales
So What?

IT is firmly believed by those who are responsible for the results, that the formula for bigger and better range sales has been found—Low first cost, a minimum down payment (or none at all), and the balance extended over a long enough time to keep the monthly payments under five dollars. This formula is variously named—rental, rental purchase, or extended time purchase. It has brought results.

FIRST—A LOW COST RANGE

The first essential for this merchandising plan is a low cost range. The manufacturers of ranges are now producing ranges at a price undreamed of two or three years ago. All of these low priced ranges represent full value for the money. If low cost with the attendant advantages of low terms will sell ranges, then any and all of these low priced models should produce increased sales. This, however, has been disproved.

EYE APPEAL

The lady of the house will not take any range just because it is electric and priced low. She has many other types of ranges, full sized, attractively designed, and as low or lower in price from which she may choose. The electric range must have eye appeal, be comparable in size, and look as simple to operate as it really is. It must require a minimum of adjustment and service; for nothing will discourage a new owner more than to have a service man chasing into her home a half dozen times, even though he makes only a few minor adjustments; and there is no bill to pay.

THE MERCHANDISING TREND

The two new Crawford ranges were designed particularly to meet this present merchandising trend. The 300 which can be retailed for less than $80 and the 400 which will sell for well under $100 permit extended terms and low payments, and compare more than favorably with competing merchandise. The attractiveness of these ranges has been approved and endorsed by Mrs. Housewife.

These two Crawfords just missed being twins by a surface unit. They are built on the same chassis, are identical in size and appearance, with the exception that one is a three unit and one a four unit range.

LOW SERVICING COSTS

Both these ranges have the Hilo Toggle Switches—the value and long life of which have been demonstrated fully by eight months' experience in actual home use. These switches, pioneered by Crawford, have cut down servicing not only for switches, but units as well. Mounted on the back splasher, the switches are conveniently placed for ease in reading the unit designations and manipulation. They actually make it easier to cook the correct and most economical way.

The Crawford No. 16-300 and No. 16-400 are built with a welded frame and the enameled sheets are so fastened that there is no strain on any of them, thus practically eliminating enamel chippage. Each range has a full sixteen inch oven, with automatic oven controls, and uses the low wattage top coil as an auxiliary to the regular 2000 watt bottom unit. This makes for a fast oven, good heat distribution and excellent browning with loaded oven. The oven door is controlled by two springs, one at each corner, assuring even fit, and is provided with a broiler stop. Appliance receptacle and/or timer receptacle to provide for time control of oven operations with an electrically wound timer are optional features that may be added at any time for a very small amount.

Although priced low, the Crawford 16-300 and 16-400 are worthy of the famous old Crawford name and merit the attention of every utility and dealer interested in increased, *profitable* electric range business.

For prices and complete information regarding these Crawford electric ranges write to Walker and Pratt, 31 Union St., Boston, Mass.

The Crawford 16-300 T. V. A. model—a full size 3 surface unit range. Fast, simple to operate, economical. Designed to sell under $80.

The Crawford 16-400—4 surface unit. Priced to yield a substantial profit margin and still retail well under $100.

Chem & Met

[ANOTHER McGRAW-HILL PUBLICATION]

Announcing

A SPECIAL ISSUE THAT WILL INTEREST WEST COAST POWER MEN

CONCURRENT with the meeting of the American Chemical Society in San Francisco, Chem & Met will publish in August, a West Coast Issue. This is in keeping with Chem & Met's policy of featuring each year, a section of the country contributing pronounced progress to chemical engineering.

Due to availability of raw materials and an abundance of natural gas, petroleum, water (a most important factor in chemical plant location) and low cost electric power, the process industries have leaped ahead at a rapid rate throughout the whole Pacific coast area. Eastern chemical manufacturers have naturally turned their eyes to the west in planning plant expansion and product development.

The power companies on the Coast have contributed much to the development of chemical engineering in their area—through attractive rates and intelligent selling.

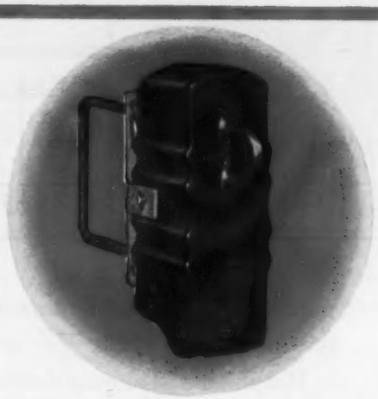
Announcement of the West Coast Issue is made at this early date to enable power companies to include Chem & Met in whatever plans they are making to sell the Pacific Coast's resources and facilities to the chemical engineers who are the decision men in matters of plant location. These regional issues, although treating of a certain section of the country, are widely read by chemical engineers everywhere. Location is everything. Last year's Southern Issue was out of stock three weeks after it left the press, in spite of the extra hundreds that were run off. We are confident that the August West Coast Issue will be received with the same enthusiasm.

Make a note now to plan an industrial site-selling advertisement for this issue. Our San Francisco office will give you further details and will advise you regarding the kind of information chemical engineers want when they are looking for new plant locations.

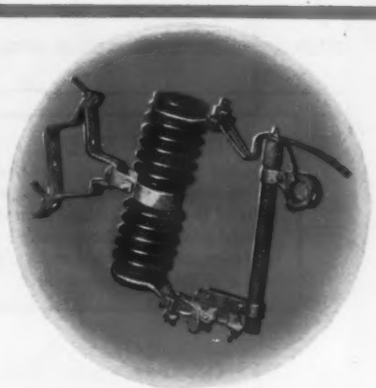
ABC **CHEMICAL & METALLURGICAL ENGINEERING** ABP

330 West 42nd St., New York — 883 Mission St., San Francisco

IT WILL PAY YOU TO
Look into G-E Cutouts



1 G-E enclosed, expulsion-type fuse cutouts, since their introduction seven years ago, have thoroughly demonstrated their ability to stand up under the hardest kind of service. They provide maximum safety for the lineman.



2 G-E open fuse cutouts with drop-out fuse holders will save you time and money in detecting blown fuses and in restoring service. Their simplified design makes fuse renewal easy and reduces the costs of maintenance to the minimum.

3 G-E 2-in-1, enclosed indicating and drop-out fuse cutouts give you your choice of two methods of indication—by partial opening of the door, as shown here, or complete opening. Safety, ease of fuse renewal, and positive operation are other features of this cutout.

4 G-E oil fuse cutouts will protect your service and equipment where high speed and high interrupting ability are required. They are quiet in operation and may be used indoors and where explosive gases are present. The subway type, shown above, will operate submerged.

G-E FUSE CUTOUTS have high mechanical and electrical strength. Used with G-E fuse links, they give full-range, short-circuit protection for distribution transformers. Their liberal factors of safety have been effectively demonstrated by short-circuit tests, flashover and puncture tests, A.I.E.E. thermal and dielectric tests, as well as by service records and other tests.

The standards set as a result of these tests are maintained by constant laboratory supervision of materials and continued testing of parts and complete cutouts.

Ask your G-E representative for further information. General Electric, Dept. 6 T-201, Schenectady, N.Y.

340-15

GENERAL ELECTRIC

Hotpoint Summer Campaign to TAKE UP THE SLACK

IMPORTANT NOTICE! See Hotpoint's double page national advertisement in the July issue of McCall's magazine, out June 8—part of the electric range manufacturers' concerted program to keep range sales moving at a lively rate. Watch for detailed announcement of this dynamic activity.

THIS year, more than ever before, a summer campaign can be expected to produce handsome returns.

Public opinion has crystallized in favor of the electric range and the industry can look to the range as the next major appliance to occupy the center of the electrical stage. The first quarter of 1935 saw a great upturn in electric range selling.

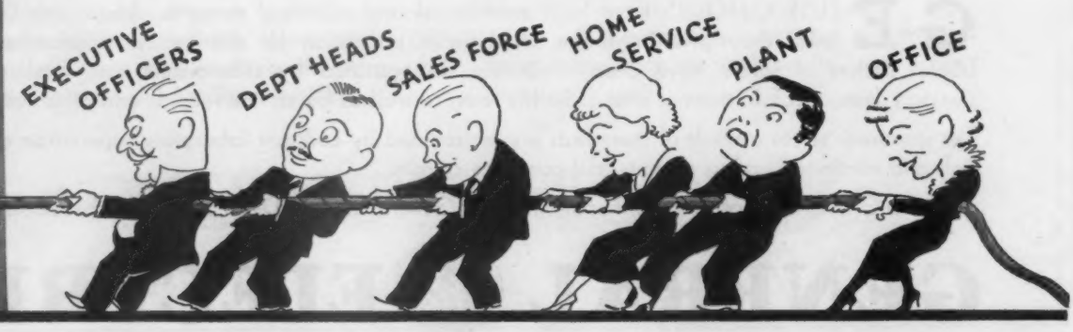
An organized effort is needed to avoid the let-down which creates summer slumps. With the electric range business hitting a pace never before experienced in the industry, Hotpoint releases a mid-summer activity designed to keep up the momentum.

Hotpoint's "Take up the Slack" campaign is complete with a novel "Cool Kitchen" contest, new direct mail literature, display material, outdoor posters and assistance from range specialists and home economists in helping to make this summer the greatest seasonal success the range has ever enjoyed.

Write today for Hotpoint's "Take up the Slack" campaign or get in touch with the Hotpoint representative in your territory. Take advantage of this active opportunity for electric range selling by putting on an aggressive local campaign this summer.

EDISON GENERAL ELECTRIC APPLIANCE CO., Inc., 5612 W. Taylor St., Chicago, Ill.

ELECTRIC RANGES **Hotpoint** **WATER HEATERS**



ELECTRICAL WEST

[*Devoted to the economic production, transmission and distribution of electric power and its application to industry, commerce and the home in the Pacific Empire, and to the sale and distribution of electrical utilization devices, equipment and appliances in that area*]

May 1935

Government Investigations Hinder Recovery

By WALTER J. WALSH
Attorney-at-Law, San Francisco, Calif.

IN this country a peculiar condition now exists as a distinct menace to our economic recovery. Business has been told by the New Deal that it must readjust itself to conditions. Business cheerfully assumed the additional burden of NRA Codes and their operation and has acquitted itself credibly. However, there is a very definite need for the President or some one in his administration to let other governmental agencies know that there is a New Deal and that certain Federal departments should do some adjusting themselves. Not a little of the uncertainty with which business is charged and which holds it in check, is attributable to hangover governmental methods that hamper legitimate business under NRA.

Specifically, the government, in the person of the Department of Justice staff does not seem to have heard that there is an N.I.R.A. It acts, in many cases, like an uncoordinated left hand to lay low what the right hand of recovery is attempting to build up. More particularly it seems to give more credence and to spend more of its budget in efforts to help the 10 per cent chiseling minority than to assist the decent 90 per cent majority to obtain fair code enforcement and a high type of ethics that every legitimate business man hoped the New Deal would bring.

Under the provisions of the Recovery Act lawful agreements are encouraged, even insisted upon, between labor and capital. The language of the act itself permits industries and trade associations to organize for self government, to wipe out unfair practices, to stabilize their operations and thereby increase employment and improve labor conditions. Repeatedly the President and those high in the recovery administration have stated "we must guard those who play the game for the general good against those who may seek selfish gain from the unselfishness of others." It is not, therefore, hard to see why right-thinking businessmen assume that the administration encourages, approves, yes even demands combinations of various business groups and associations to promote recovery measures.

Now, consider what has happened too many times since the codes have gone into operation. An unprincipled type of manufacturer, wholesaler or contractor waits until a job or contract is awarded by the Federal Government for one of its many projects by which it is attempting to stimulate business recovery. If this individual fails to obtain the contract for himself, he immediately charges his competitors with collusion for the purpose of defrauding the government. The awarding officer naturally refers the individual to the proper parties in the Bureau of Investigations in the Department of Justice or any other particular department as the complaint apparently warrants. Thus are legitimate business organizations exposed to the attacks of disgruntled chiselers with a dog-in-the-manger attitude.

The Department of Justice investigators, generally speaking, have had little contact with modern business and the provisions for its operations under NRA. Notwithstanding, such men are sent to investigate the complaint made by the price cutter. Voluminous reports on the findings follow. When checked by the proper authority, these reveal that the government has spent thousands of dollars to determine something it already knew, i.e., that that particular association was operating under a federally approved code of business ethics.

In the meantime that particular association gives evidence of the uncertainty about which financial editors have been writing of late. For playing the game, the association is awarded with a lengthy, annoying and, in most cases utterly futile, investigation incited by the very men from whom it thought the code would afford protection. The situation is not hopeless but it is serious because it is costly to business and government alike, and it should be remedied by designating somebody to inculcate the spirit of N.I.R.A. through the Departments of Justice. Then this arm of the government will be aiding instead of holding back the business recovery so much desired by the nation.

It is quite apparent to the writer that price-fixing, within its legitimate sphere, is going to play a steadily increasing part in the industrial recovery of this country. It is likewise apparent that stable industrial conditions which will provide the worker and the employer a fair return for their efforts and which will eventually relieve the poverty now existing through unemployment will continue to be the objective of business and governmental activity. Such being the case, why not have a new deal for investigating agencies of the Federal Government whereby complainants are investigated first on the theory that legitimate complaints can be handled by the local Code Authority and it is only the operator who will not cooperate with his local group that has to appeal to the Federal Government to protect himself from a price cutting suicide.

Engineering Symposium + + +

[A monthly forum in which engineers will present and discuss their problems, this department is dedicated to advancing the art of power generation, transmission, distribution and utilization]

Direct Current Transmission Given Practical Demonstration

New Development Extends Frontiers of Profitable Hydro-Electric Generation and Suggests Practical Way of Interchanging Power Over Wide Area

PROBABLY in no other section of the country are the possibilities of direct current transmission as recently announced by the General Electric Co. as intriguing as in the West. Here high voltage a.c. transmission was pioneered and perfected as the fundamental of profitable hydro-electric generation. Here the advent of cheap natural gas in certain localities has become a serious competitor as a producer of low cost power in utilization centers, low fuel costs balancing the high investment costs of hydro development and long transmission lines.

Is it not provocative of thought that the practical development of direct current transmission may permit more power to be transmitted over present facilities or equal power over longer distances and thereby restore hydro-electric generation as the prime source of low cost energy? Does not direct current transmission offer greater opportunities for power exchange between widely separated areas and thereby permit a more economical utilization of the runoff of various watersheds? With Grand Coulee, Bonneville and Boulder Dam nearing completion this latter possibility assumes increasing significance.

The basis for the foregoing statements is the practical application of a complete new system for the transmission and distribution of electric power, making it possible for the first time to interconnect, with static apparatus, non-synchronous systems. Utilizing electronic devices, including Thyratron and Phanotron tubes, the new system has a higher order of stability as contrasted with previous practice, and faults similar to short circuits result in a reduced instead of an increased power flow on the circuit involved.

The new system, constant-current direct-current transmission, was described in a paper presented at the winter convention of the American Institute of Electrical Engineers, in New York City in January, by Dr. C. H. Willis, of Princeton University, and B. D. Bedford and Dr. F. R. Elder, of the General Electric Co.

Direct-current power transmission is, in itself, not new but the work described represents the first time that such transmission has been accomplished in a commercial capacity by means of electronic tubes. In brief, the essential features of the new system of electric power transmission are:

It is a constant-current direct-current system where the power flow is in one direction only at the will of the operator, but the power can be transmitted in either direction if desired. Control of the amount of power flow is under the control of the operator at all times.

No wattless power is transmitted with the new system and a short circuit on any circuit of this type results in a reduction of power flow on the circuit involved. Power can be transmitted by either overhead or underground lines any distance desired with the added advantage that a circuit of this type can be tapped at any point to furnish power or to take power. Overhead systems of this type should be more reliable and less disturbance will be caused by lightning.

The nature of the circuit is such that systems of like or unlike frequencies can be operated together to feed any other system of like or unlike frequencies. The system cannot become out of phase or out of synchronism with the system feeding it or with the system receiving power.

Alternating current is at present almost universally used for power transmission, in spite of the difficulties that are so well known to electrical engineers. The difficulties of connecting systems, or even generating plants, together are many, as systems of unlike frequencies cannot be connected together readily except by means of motor generator sets, and the power flow through these motor generator sets is uncontrollable except by elaborate and expensive apparatus. Systems of like frequency are difficult to keep together in synchronism because of the phase angle resulting from the reactances of transformers and circuits. Control of power flow is largely determined by the demands of the system, and the operators have little control except by means of circuit breakers, which may be opened or closed, automatically or manually, usually resulting in interruption of service. This means that in case of faults anywhere on the system, a large concentration of power results, which may be sufficient to shake the system apart and cause considerable damage.

The newly developed direct-current system, on the other hand, places in the hands of the operator full control of his system. He can at all times control not only the amount of power flow but its direction. The system cannot get out of phase or out of synchronism; and faults, such as short circuits, cause a drop in kva. flow rather than an increase such as exists on all present systems.

Stations of like frequency or unlike frequency can be connected together with the new system to feed the same distributing system without any trouble.

As most loads of power systems are of lagging power factor, the transmission of the resulting wattless current adversely affects the capacity of the circuits, the transformers, and the generators feeding the system. With the new system, all the load on the generating stations will be slightly leading, rather than lagging, and no wattless power is transmitted. The wattless current required by the loads is supplied by the inverter equipment. This results in lower generator and transformer heating, and improved regulation.

As a practical demonstration of the new development, a circuit was installed in the G. E. Research Laboratory at Schnectady designed to transmit 150 kw. of power, the circuit operating at a maximum peak of 15,000 volts and 10 amp. This proving to be satisfactory, a larger installation was made in one of the factory buildings in the Schenectady works in which connection is made to a 13,800-volt, 60-cycle, three-phase, alternating-current bus of the New York Power and Light Corp. with a circuit for transmitting a constant direct current

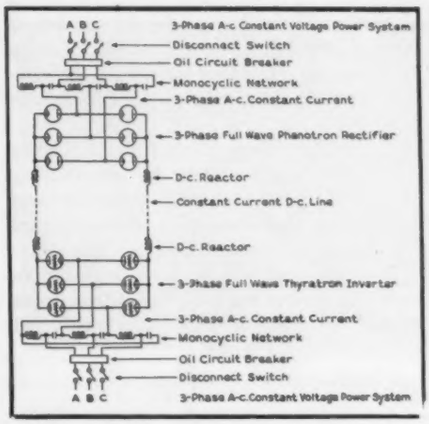
of 200 amp. at 15,000 volts to ground. The latter circuit includes about 15,000 ft. of underground conductor, and is connected back to the 13,800-volt bus, after being inverted from direct to alternating current of the proper characteristics.

In this 3,000-kw., constant-current, direct-current circuit a group of condensers and reactors are so connected to the 13,800-volt bus that constant-current alternating current is obtained, the circuit being tuned so that this current is 200 amp.; the voltage varies with the load. The alternating current is then rectified by means of six Phanotron tubes. (If two-way transmission is desired, Thyratron tubes are used.) Losses at each end of the network are approximately one per cent of the power transmitted.

High-voltage, constant-current direct current is thus produced. After passing through some direct-current smoothing reactors the current goes through the 15,000-ft. length of underground conductor — representing transmission of the energy—after which it is received and passed through another direct-current smoothing reactor. Six Thyratron tubes then invert the direct current into 60-cycle, three-phase alternating current of constant value. Another group of reactors and condensers then changes this constant current into constant-potential alternating current, the current output at this point varying with the load. Connection is then made back to the alternating-current bus in the factory. Such an arrangement of condensers and reactors constitutes what is known as a monocyclic network. There is no reason why this 3,000-kw. installation could not be doubled in capacity by putting a similar outfit on the other side of ground with the result that a 3-wire connection similar to the Edison system would be obtained with a 30-kv. potential existing between the two outside wires.

One feature of such a network is that, if it is tuned for a certain definite current and if it receives this current, constant potential results at the output terminals. On the other hand, if it is supplied from a constant potential bus, constant current will be obtained at the terminals. Neglecting the losses in the reactors and condensers, the power factor on both sides of the network is equal, but of opposite value. The input current will lead by exactly the same angle that the load current lags, an ideal situation with regard to the generating equipment as the leading current tends to magnetize the fields and reduce the input to the field windings.

No transformers have been used in the installation made in the Schnectady plant, but, in a commercial installation,



Schematic Diagram of D.C. Transmission network. Transformers may be installed at either end of the system as required

it is probable that transformers would be used at both ends of the line—at the sending end for increasing the voltage to that point desired, and at the receiving end for reducing the voltage to suit that of the receiving system.

The rectifier end of this network connected to a constant-potential system will furnish a sufficient voltage to cause the full-load current of the direct-current system to flow. Thus, if a short circuit of low resistance exists close to the rectifier, the voltage furnished by the rectifier will be very low—only sufficient to overcome the low resistance of the short circuit. The kva. flow, then, will be reduced and, if the resistance is of very low value, the voltage will collapse to practically zero.

At the receiving end of the line, or the inverter, the tubes, being arranged to pass current in one direction only, will operate as an inverter as long as constant current is received from the rectifier. Failing to receive this constant current, the inverter becomes a rectifier and draws full-load current at low voltage from the alternating-current system to which it is connected. The polarity of this current will be reversed, however.

If a short circuit occurs on the the direct-current line, and if the constant current of the system is 200 amp. and the regulation of the line is 10 per cent, then the current flow into the short circuit will be about 20 amp. The voltage on the direct-current line drops to that point necessary to cause 20 amp. to flow in the short circuit.

As soon as the short circuit is removed, normal current flows in the normal direction, the rectifier furnishes its share of the current; the inverter receives the current which is inverted and furnished to the receiver system as constant-potential alternating current.

If, when the line is operating under normal conditions, the cable is short-circuited by means of a single-pole knife-blade switch, the voltmeter reading drops practically to zero but the current remains constant. If the switch is then opened, the voltage returns very promptly and at all times the current remains constant.

A further interesting demonstration is made by short-circuiting the line through a 6-amp., 250-volt cartridge fuse. The fuse blows, thus opening the short circuit; little disturbance is caused by the blowing of such a fuse.

In still another demonstration an insulator normally used on an 11,000-volt, alternating-current line is employed. Two such insulators are usually used on such a line, but in the demonstration there is only one. If an attempt is made to arc over the insulator by short-circuiting it with a small wire, the arc-over of the insulator cannot continue. It is indicated that overhead lines can be built with fewer insulators than are now required for alternating-current power since, while they may arc over because of a lightning flash, the dynamic current of the system is limited and the arc will extinguish itself. Each insulator thus becomes a lightning arrester to clear the line of any high-voltage transients.

Thury, the French engineer who developed the direct-current transmission system which bears his name and which consists of cascading direct-current generators until the desired voltage is reached, proved conclusively that direct-current transmission lines are far more reliable than alternating-current lines of equivalent capacity. However, his system was not widely adopted because of the difficulties of high-voltage commutation, the high investment necessary in rotating equipment both at the sending and receiving end of the system, the large losses and relative inflexibility of the system.

With the electronic method of rectifying and subsequently inverting the current, the following summarization of advantages seem to make this new tool for the efficient and economic distribution of power particularly applicable in the West:

1. It promises a reduction in transmission losses by eliminating charging current and by permitting a higher transmission voltage without re-insulation and with decreased corona losses.
2. It will enable a transmission line to be tapped for any type of voltage and current requirements, and make possible a wider and more economical method of rural distribution service.
3. It may have the effect of increasing the capacity of existing urban substations by permitting the delivery of more power with the same facilities.
4. It may eliminate the necessity of rebuilding distribution facilities in

densely loaded areas as d.c. will permit greater amounts of power to be carried over the present copper area.

5. It promises improved cable operating practice by maintaining a relatively constant temperature in the cable and thus relieve both the problem of the formation of voids in cable insulation and the possibility of deterioration due to corona having its inception in such voids.

6. It would improve "dispatching" and consequently improve service to the customer by preventing large power flow toward faults on the transmission and distribution system, thus making it easier to maintain and restore service, and eliminating the stability problem.

7. It promises to reduce the costs of future developments by eliminating the need for condensor capacity and for the heavier insulation now required for the same transmission voltage.

8. It possibly will provide for economical power exchange between areas whose watersheds may have different characteristic runoffs.

Repairing Water Wheel Runners by Arc Welding*

By R. F. MILLER
Portland General Electric Company

WHILE this paper deals principally with recent experiences in arc welding the pitted areas in bronze and cast-steel Francis-type water wheel runners, it may be of interest to cover some of our earlier experiences along this line. The first runner welded in 1920 was a 2,500 hp., 120-ft. head runner from our Cazadero plant. This wheel was preheated and the pitted areas on the discharge side of the vanes welded with the oxy-acetylene torch, using tobin bronze welding rods. The net result was a fairly good weld but a badly warped and distorted runner. Succeeding runners were repaired by the arc-weld method, using the same type of rod. This rod was of approximately the same analysis as the material in the runners, that is 60 per cent copper, 39.25 per cent zinc and .75 per cent tin. As zinc is very unstable under the high temperatures produced in the arc, a high "sputter" loss was encountered, and the weld deposit itself was somewhat porous and not too well bonded to the parent metal. However, this was the best rod available at the time.

All things considered, these repairs were successful. No distortion of the runners was encountered and no further repairs were necessary for eight or ten years, although pitting was resumed in the welded areas in two or three years.

The pitting in the runners of our Bull Run, River Mill and Cazadero plants has been mostly confined to the outer discharge side of the vanes and has been quite uniform in extent (Fig. 1). In some of the wheels pitting has taken place on the inlet edges of the vanes and in the outboard seal ring section, but this has been of minor extent. In some cases the discharge side of the vanes has pitted through after eight or ten years' service.

Reports No. 4 and 5
of the Engineering and Operating Section, Northwest Electric Light and Power Association.

Since 1930, phosphor-bronze arc welding rods have been used in making repairs on the bronze runners. This rod contains no zinc and melts at considerably higher temperature than the bronze in the runners, thereby assuring good penetration and an excellent bond. These rods cannot be used overhead, however, so all runners repaired have been removed from the machine. The first runners welded with this rod have been in continuous service since 1930 in our River Mill plant. On a recent inspection about the only pitting found was outside the welded areas. It is expected that these runners will give very much longer service than those welded before the phosphor-bronze electrodes were used.

In preparing the runners for welding, all pitted areas were chipped down to clean metal with a light pneumatic chipping hammer and, if cracks were present, these were "veed-out" right through the vane. In many cases the vanes were so thin from pitting that quite large holes were left after the chipping operation (Fig. 2).

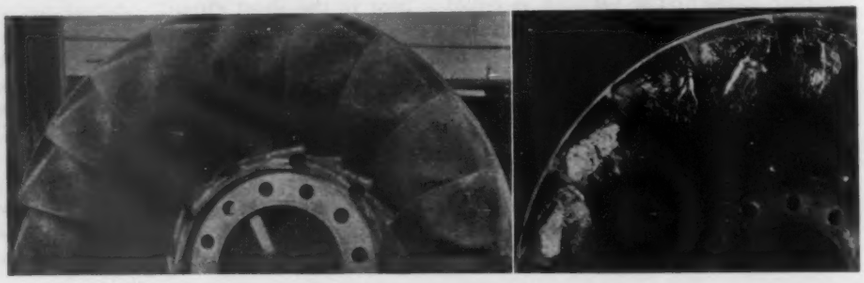
To facilitate welding where holes were present, a backing-up plate was made of ¼-in. copper formed to the exact contour of the vane and wedged in tightly so as to cover the hole from the back or inside. The weld metal will not bond to the copper so this backing-up plate can be used over again. The hole was then closed up with the first bead (Fig. 3). Successive beads or layers were then put on, each layer being not more than 3/16-in. in thickness. After every bead the weld is peened lightly to relieve any strains left by contraction of the weld deposit. To avoid excessive heating of any localized area and possible distortion of the runner, only one bead is run on a vane at a time. The welder then moves to another section of the runner to continue welding.

After the welding operation is completed, the vanes are ground down to their original contour with a high speed portable grinder, using a grinding wheel small enough to pass between the vanes (Fig. 3). Using this type of grinder it is possible for one operator to finish grinding all the vanes in a 2,500-hp. runner in eight hours.

To protect the welder from fumes generated by this type of welding, a 12 or 14-in. fan is placed behind and a little to one side of the welder so that the fumes are carried away as fast as generated. A fume mask was tried at first, but it was very difficult for the welder to use the hood and mask together. It is very important that this feature of the work be carefully watched as the results of inhaling these fumes will not be noticed until the following day and may

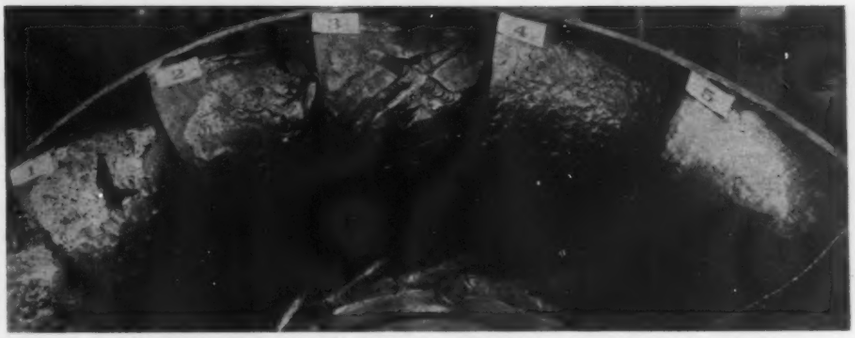
Fig. 1—Bronze runner before repair

Fig. 2 — Bronze runner prepared for welding



*A report prepared for Production and Generation Committee, Engineering and Operation Section, Northwest Electric Light & Power Association, for presentation at 1935 Annual Section Meeting.

Fig. 3 — Bronze runner showing step-by-step welding repair



result in serious illness of the operator.

The same procedure was used in welding the cast steel runners, except that a medium carbon steel electrode was used. Fig. 4 shows one of the cast steel runners repaired in 1930. After four years' service there are only three weld deposits that show pitting, and on close examination it is apparent that the beads on these were laid on too far apart to make a homogeneous weld. When the next cast steel runner is repaired stainless steel electrodes will be used as enough experience has been gained in repair applications with this electrode to justify a trial on the water wheel runners.

There are ten bronze runners in service at our Cazadero plant, eight at River Mill, and the Bull Run plant has four cast steel runners. Most of these runners would have been replaced at least once in the past twenty years if welding had not been used.

Cost of the repairs, including material, labor and superintendence, has averaged slightly less than $100 per wheel as against a replacement cost varying from $900 to $1,100. Dismantling and assembly costs have not been added to the cost of the repairs as they would also be incurred if a new runner were installed. From our past experience we see no reason why these wheels cannot be maintained indefinitely, without replacement, at a yearly cost of not to exceed $10 per wheel.

Fig. 4 — Welded cast-steel runner after four years of service

Fig. 5 — Bronze runner showing welding completed

Industrial Surveys for Load Building*

By **PAUL P. ASHWORTH**
Utah Power & Light Co.

IN THE electric power industry the trend of the times definitely is toward an enlargement and extension of the service rendered. Witness the "home service" surveys, the "Better Light — Better Sight" campaigns, and the "home cookery" schools, all emphasizing the outstanding value of electric service in the home and the conservation of human effort and human values. Witness also the increasing emphasis being placed upon the adequate servicing of home and commercial lighting and appliances.

One important field of service seems to have been quite neglected. The purpose of this paper is again to direct attention to the industrial power field, and to provoke a discussion which may point the way to its more intensive cultivation in the load-building program.

Power companies generally have hesitated themselves to carry on investigations of power use inside of industrial plants for various reasons, among which are:

1. It has been taken for granted that the plant operators know their business; that they know how to operate at maximum overall efficiency; and that they use their electrical equipment and service to the utmost economical advantage.

2. It is assumed that if the plant managers need technical advice on matters of electrical application and use, they will employ competent consulting engineers or specialists to work out these problems.

3. It is assumed that if the utility engineers enter the customers' plants to conduct surveys and investigations, and make recommendations, the utility is thereby assuming obligations for successful plant operation that may be embarrasing and expensive.

4. It is assumed that the cost of conducting such surveys will be more than the benefits achieved.

5. It is assumed that utility staffs should not compete with professional engineers and technicians by making industrial power surveys.

Experience covering many years and a large number and diversity of industries indicates that for the most part, and as applied to industrial plant electrification, these presumptions are not founded upon facts.

Before analyzing these assumptions and presenting data to support the foregoing conclusions, it may be well to digress for a moment briefly to lay down broad fundamentals.

1. The best potential market of a power company is its present customers.

2. The interests of the power company and of its customers are identical, at least to the extent that the continued prosperity of the power company depends upon the continued prosperity of its customers.

3. It is mutually advantageous to utility and to consumer that the electric service be used at maximum overall plant efficiency and on the most favorable terms.

4. Manifestly, rates should be adapted to customers' conditions and output. It should perhaps be kept in mind, in passing, that in a vast majority of cases the amount paid by an in-

* A paper prepared at the request of the Utilization Committee of the Engineering and Operating Section of the Northwest Electric Light and Power Association to be presented at the 1935 Annual Meeting of the section.

dustrial establishment for electric service is a small part — less than 5 per cent—of the total cost of production or manufacture. The regularity of the monthly bills for electric service, and the pressure of competitive and political influences, have emphasized the power bill out of all proportion. It should likewise be remembered that in so far as the power utility is concerned, its revenue comes solely from the sale of service, and that therefore, the sale of additional service and the holding of present business is of paramount importance.

5. "A satisfied customer is the best advertisement."

Returning now to the matter of industrial surveys, it may be profitable to analyze the various assumptions in the light of facts:

1. It may be conceded that the operators of industrial plants know their business and know how to operate with reasonable efficiency. It cannot be conceded that they are, in all cases, using electrical equipment to the maximum economical advantage. Power surveys of almost any plant will disclose cases of inefficient, inadequate, obsolete equipment still in use; poor applications of equipment, men and rates; insufficient power per workman; etc.; most of which may be corrected at relatively small expense, with resultant lowered overall costs of production.

2. The vast majority of industrial establishments are small plants, devoted to some kind of specialized output. After the original installation of the plant—which may or may not have been carefully engineered—the power supply and equipment are turned over to a plant electrician, or mechanic. Any one visiting such plants must be impressed with the splendid work these men are doing to "keep the wheels revolving." But they are not qualified, by experience or training, for the larger analytical job involved in the electrification problem — even if they had the time to devote to it, which usually they haven't. The regular employment of a consulting engineer or specialist in such plants is not warranted and cannot be justified. Surprisingly, in many of the larger plants, which profitably might employ a man of higher calibre, the situation is much the same as in the small plants.

The foregoing statements are not to be construed as implied disparagements of industrial plant managers and operators. In the main, industrial managers do not sense the need of periodic thorough-going power surveys because the cost of electric service is relatively such a small percentage of the total cost of operation.

The net result of the situation, however, is that industrial plants rely largely upon the plant electrician, who may not be competent to advise, or upon a manufacturers' agent, who does not pretend to set himself up as an unbiased industrial engineer, and who, regardless of personal qualifications, is generally not equipped for such work.

3. The question of legal obligations involved when utility engineers conduct investigations upon customer's premises and equipment is one for the lawyer. From the lay standpoint, there appears to be no difference between such industrial surveys, and the home surveys which are so widely conducted and which have led to no legal difficulties. Experience indicates that the obligations are more fancied than real, and the possibilities of embarrassment to the utility may be made practically nil by the selection of properly qualified men to conduct the survey and advise the customer. Surely, nobody is so much interested in seeing that the customer has an adequate, dependable and economical power supply as is the power company, and this fact gives the customer every assurance that a good job will be done. As a matter of fact, experience shows conclusively that the relations between consumer and utility company are vastly improved as a result of cooperative power surveys.

4. The cost of conducting a power survey depends, of course, upon the size, location, and nature of the industrial plant. One engineer made a complete power survey of a large coal mine (4,000 tons daily capacity), analyzed and worked up the data, and made a full written report in less than three weeks. A large metal mine survey required five days. A municipal pumping plant job two or three days. The costs are very nominal.

The benefits can be ascertained only after the completion of the analysis.

In addition to the goodwill and increased mutual understanding, also confidence growing inevitably out of such surveys, which alone may justify the expense and the increased revenue which may be expected, there are other direct benefits of outstanding importance. The user will be impressed with the great value of electric service as compared with its relatively small cost; the "veil of mystery" surrounding rate structures —load factor demands, etc.—will be stripped away, and the common-sense business-like aspects of these factors will be apparent to the user; he will approach the problem of extending his electrical service with far greater assurance and less suspicion; and the utility will learn to appreciate the problems confronting its customers, and will be in a position to develop service methods and rate structures better adapted to the actual needs and circumstances of its patrons.

5. The question of competition with professional engineers is one that merits consideration. The facts indicate however, as discussed under item number 2 in the foregoing, that power surveys are not now being made to any extent by anybody, so that for the utility engineers to take over this necessary job will not injure the professional engineer or anybody else. On the other hand, it may be expected that power surveys will disclose to the plant operators the high desirability of thorough-going surveys and analyses of all plant operations, looking toward greater efficiency, and this will create intensified demand for the services of the professional consultant.

An important consideration in this conection is that the utility engineer has entree to the customers' plants which the professional engineer does not have, and since the advisory service, as contemplated here, will be without cost to the plant operators, it may confidently be expected that the latter will avail themselves of the services.

It is not contemplated that the utility engineer shall draw plans and specifications, or do detailed engineering work on such installations or rehabilitations as may be authorized to effectuate his recommendations. This work properly will be left to the engineer employed by the operator.

Of paramount importance is the selection of engineers for this industrial survey work. It, definitely, is not a job for the power salesman, or in fact, for anyone whose prime duty is to try to make a sale. It is a job for an engineer of wide experience and training, of analytical, inquiring mind, and of highly developed imagination, who can attack the problem with a wholesome degree of detachment, and a desire to render the customer a valuable service. It is quite likely that in many situations it will be most economical and effective for the utility itself to employ an outstanding independent engineer to conduct these power surveys, and thereby to capitalize upon talent already developed and available.

The results of actual power surveys made by power companies and by others are most convincing as showing the possibilities of this type of program.

Facts and experience justify the recommendation that member companies give careful consideration to the matter of conducting industrial power surveys, and that the facts and methods developed in such surveys and analyses be disseminated, in so far as confidential features permit, among the other member companies for mutual benefit and

guidance. Members are invited and urged to contribute data and results of actual surveys to the discussion of this paper.

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Discussion

By LeROY A. GRETTUM
and O. D. LANNING
Eastern Oregon Light & Power Company

Commenting on the excellent paper which has been prepared by Mr. Ashworth, we should first of all call attention to the fact that he has treated his subject so completely as to make extensive elaboration unnecessary.

The experience we have had in our territory fully confirms Mr. Ashworth's main points. There has been too much past tendency to wait until relations with a particular power customer are strained before the utility engineer gets on the job. If we are to obtain the degree of benefit in improved customer relations which our effort and expense should justify, we must see to it that we do not lock the barn after the horse has been stolen.

In such efforts toward customers' load and use surveys as have already been made by utility engineers, ensuing records have often been incomplete. It is not enough to go out and do the job. We must follow up our surveys with some kind of analysis, to be made after the expiration of a suitable period, which will make a matter of record the beneficial results obtained. This analysis must be prepared in a brief and easily understood form, so that the customer can grasp it readily.

In our opinion, the possible legal complications and also the effects of so-called competition with private consulting engineers loom much larger in talk than they are in reality. As a matter of fact, neither of these elements is present in the vast majority of surveys which could be made with advantage to company and customer alike. In those rare instances when the situation obviously calls for attention by a consulting engineer in the customer's employ, we are sure that the utility engineer who has been working on the problem up to that time would be the first one to call attention to the situation.

Finally, we should realize that the very nature of modern electrical service and equipment invites abuse and misapplication. The power supply is so continuous and steady, and the great majority of electrical appliances are capable of so much over-loading, that the average small power user never pays any attention to the situation once his equipment has been placed in operation. All too frequently, we find conditions which can be corrected at a moderate investment, which have been costing the customer substantial sums in heat losses or service below par. In view of the fact that the cost of electric power is in most instances such a small part of the total production cost, the user cannot be expected to pay much attention to it. Certainly, if the power company does not make these surveys, they are not going to be made.

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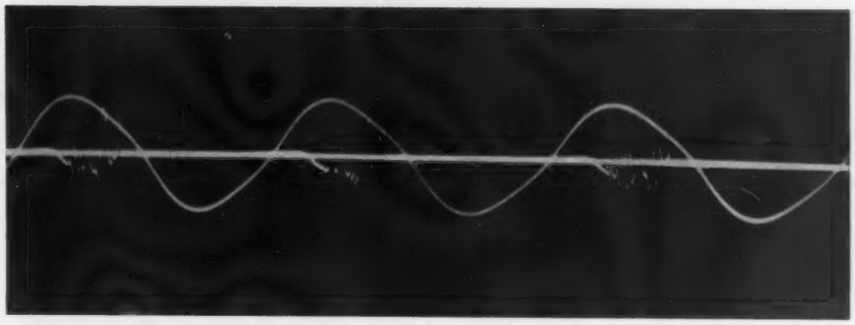

Fig. 1—Oscillogram showing radio interference due to a.c. conductor corona

Radio Interference From A-C Conductor Corona

DURING the past five years an investigation of the origin and methods of mitigating the radio interference from high-voltage transmission lines has been conducted by the Oregon State College Engineering Experiment Station in cooperation with the Northwest Electric Light and Power Association. In connection with the study of the radio interference caused by a.c. conductor corona, a number of very interesting phenomena were observed. One of these is the fact that normally a conductor in 60-cycle a.c. corona only produces radio interference when the conductor is negative and not when it is positive.

The oscillogram, Fig. 1, shows the radio interference phenomenon due to a.c. conductor corona. The 60-cycle conductor voltage is shown by the sine wave. The oscillograph vibrator, recording the voltage, was connected to deflect above the zero axis when the conductor was positive and below when it was negative. A second vibrator recorded the audiofrequency output of a superheterodyne receiver tuned for 1,000 kilocycles and arranged to pick up the radio frequency radiation from the conductor due to corona. Upon examination of Fig. 1 it will be observed that interference occurs only when the conductor is negative. A wide range of sizes of solid wires and stranded cables both polished and weathered were investigated and found to exhibit this same typical characteristic. It is only when a conductor is unusually badly mutilated, contaminated with grease, or with some other foreign substance, that the positive corona will produce radio interference.

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Dual Service Trolley Busses To Go on Trial Run

ACCORDING to Business Week, the Public Service Co. of New Jersey has developed a combination trolley and motor bus which seems to be the answer to the transit industry's prayer. Sixty-two of these all-service vehicles have been ordered.

The new bus will be used as a trolley bus where overhead lines are available, and due to its gas-electric engine combination, can run on its gasoline engine power where there are no power lines. This has been possible by using electric driving motors which can be operated either from overhead trolleys or from the gasoline engine, the latter having a supercharger which increases its rated capacity of 126 hp. to 160 hp.

The obvious advantages are that the bus will have the power and acceleration of an electric car and will enable efficient utilization of the investment in power plant equipment. Furthermore, the substitution of trolley buses for the conventional street car can be made with permission of the state commission without jeopardizing perpetual franchises which go with tracks and poles. The additional advantage is in the ability of these busses to move under their own power to downtown storage instead of having to return to the barn between peak load periods. This alone accounts for a large operating saving.

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• THE WEST KOOTENAY POWER & LIGHT CO., LTD., has acquired the distribution system of the city of Greenwood, B. C. Approval of the deal has been granted by the Provincial Government as the trustee for the bondholders. This move will insure an excellent light and power service at all times.

In the Realm of Science + + +

[Devoted to the research and scientific developments which affect the electrical industry and which are being carried on in the engineering departments of Western universities. Edited this month by Ward B. Kindy, Electrical Engineering Dept., Stanford University]

Characteristics and Energy Relations of Conductor Vibrations

By DUANE B. FISH and FRANK E. GREGORY

THAT mechanical vibrations due to purely mechanical causes exist on transmission line conductors and play an important role in the deterioration of line and tower equipment is a generally recognized fact.

Not until long spans and high mechanical tensions were employed did vibration come to the notice of transmission engineers. Even then periods of time up to fifteen years were usually required for any damage to become manifest in the form of broken conductor strands at the point of support. Such has been the experience of the operating power companies.

Wind moving normally to a conductor creates eddies along its leeward side. These eddies cause alternating rarefactions and compressions, which exert minute vertical forces on the conductor. When the frequency of these eddies approaches one of the natural frequencies of the conductor, the conductor will vibrate at that frequency.

In the spring of 1933 the city of Los Angeles undertook measurements of conductor vibration and built a wind tunnel at the Ryan high voltage laboratory for that purpose. The results were valuable and the object of this study was to carry forward those investigations. It was desired to measure the amplitudes and frequencies at which the conductors would vibrate, the wind velocities most favorable for these amplitudes and frequencies, and the mechanical power transferred from the wind to the conductor to sustain these vibrations.

The Apparatus

The wind tunnel consisted essentially of a large ventilating fan, driven by a 75-hp. motor, which discharged through a tapered conducting chamber into a large surge, or pressure chamber, a series of plenum chambers to guide the air into the orifice, and the orifice itself. The orifice was 50 ft. long by 2 ft. high and it was in this that the test conductor was suspended. Air issued uniformly along its entire length from the plenum chambers in back. A suitable conduit directed the air from the orifice back to the fan intake. The air circuit thus was closed upon itself, eliminating disturbances caused by outside wind conditions. The velocity of the generated wind was varied by means of a throttle over the intake, the fan operating at a constant speed.

The conductor specimens, suspended in the orifice, were about 57 ft. in length. End connections to the conductors were made through knife-edge devices which served to minimize end losses. Steel cables extended from the knife-edge mechanisms to suitable anchors. Adjustment of conductor tension was by means of a bell crank with a high mechanical advantage. The long arm was loaded with weights, the short arm attached to the conductor. This arrangement maintained constant tension over a reasonable temperature range. To measure the wind velocity issuing from the orifice a vane type anemometer and a stop watch were used.

Attached to the conductor was a strip of aluminum provided with a narrow slit. A light shining through the slit onto a calibrated scale gave a means for measuring conductor amplitude. With this setup it was possible to determine the characteristics of the vibrations of a conductor caused by the wind.

The energy input necessary to sustain these vibrations then was determined by artificial methods, being made by means of an electric drive and associated metering equipment.

Power for the electric drive was obtained from a two-phase generator driven through a gear reduction by a d. c. motor. A range of frequencies suitable for the tests was obtained by varying the generator speed. The drive coil operated on a principle similar to

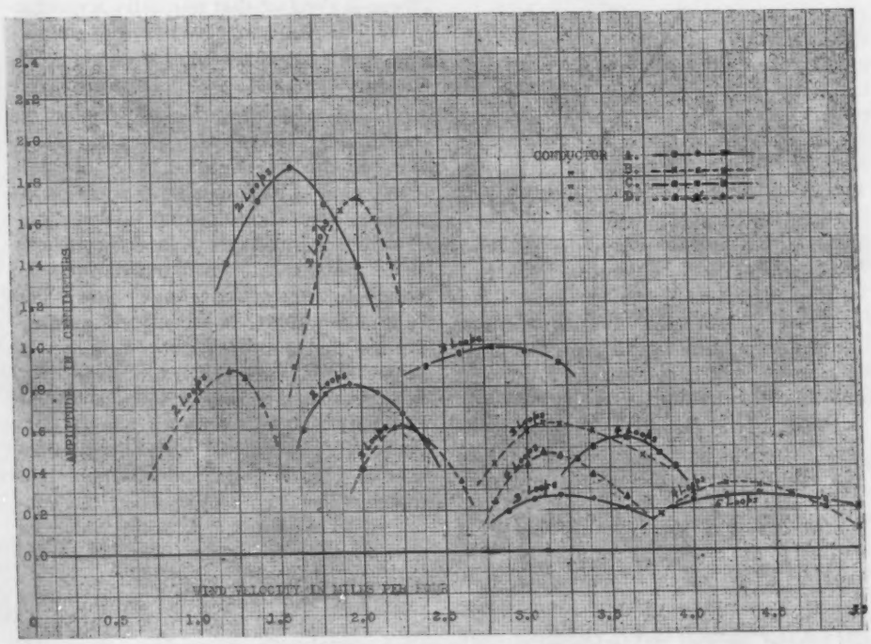
Fig. 1—Curves showing the results of the tests of vibration in the wind; amplitude as a function of wind velocity

Conductor A — 1.4-in. copper conductor, smooth-surface

Conductor B — 1.4-in. copper conductor, stranded-surface

Conductor C — 1.0-in. copper conductor, stranded-surface

Conductor D — 0.91-in. rope-lay copper conductor



that of the modern radio loud speaker. The coil, consisting of 600 turns of No. 30 copper wire, was attached to the conductor and arranged to travel in a constant magnetic field. Voltage from one phase of the generator was applied through transformers to the coil, and the coil, and hence the conductor, was thus forced to vibrate at the frequency supplied by the generator.

The current coils of two wattmeters were placed in the drive coil circuit. The voltage element of wattmeter No. 1 was across the drive coil supply. This meter was therefore used to measure power input to the drive coil. The voltage element of wattmeter No. 2 was across the other phase of the generator, this meter, indicating reactive volt-amperes, being used to hold unity power factor at the drive coil.

The conductor was driven, with the fan stopped, by this electric drive and energy input was thus determined.

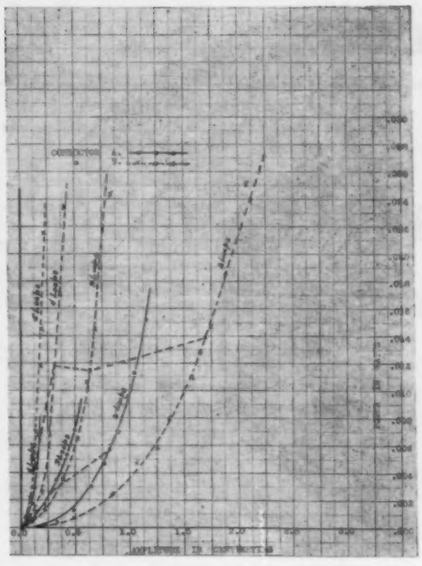
As a check on the validity of the results so obtained, another method of measurement was devised. The rate at which a vibrating conductor will decelerate after the power source is cut off is an inverse function of the losses of the conductor. By applying suitable mathematics and measuring the deceleration rates of the conductors at various frequencies it was possible to check the power values obtained with the electric drive. The agreement was very good.

The Tests

One of the basic objectives of the study was the determination of the amount of energy taken from the wind by a vibrating conductor. Accordingly, tests were made of vibration in the wind and of energy input. If it was determined that a conductor gave a one centimeter amplitude at two loops in the wind, and was also found to have an energy input of 0.05 watts at a one centimeter amplitude and two loops, then it was reasonable to deduce that the conductor took 0.05 watts from the wind to sustain a one centimeter amplitude at two loops.

Thus a test procedure was devised which called for wind velocity vs. amplitude measurements, to be directly followed by a run of energy vs. amplitude.

Fig. 1 shows the results of the wind velocity vs. amplitude measurements. For each wind velocity which gave an eddy frequency equal to one of the natural frequencies of the conductor, vibration at that frequency resulted. Thus over the total range of wind velocities a series of vibrations at different frequencies was recorded. The curves obtained for each conductor corresponded rather closely in optimum wind velocities, for the same conductor diameter, though the amplitudes obtained at a given frequency varied considerably.



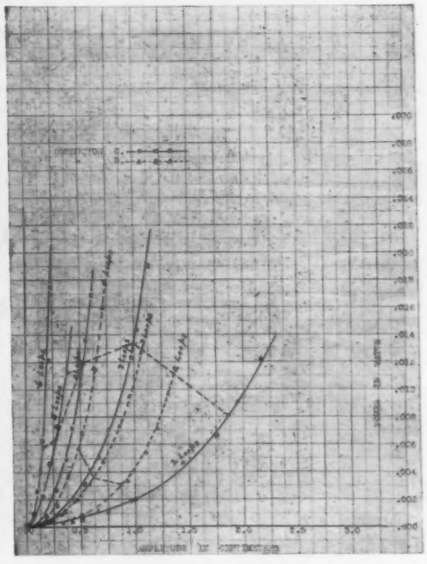


Fig. 2 (left)—Curves showing the energy necessary to sustain vibration of transmission line conductors at different amplitudes and frequencies for conductors A and B. Fig. 3 (right)—The same curves for conductors C and D. (Dotted straight lines connect points of maximum amplitude obtained from Fig. 1)

Figs. 2 and 3 are representative examples of the energy vs. amplitude data. These determinations showed that for each frequency of vibration the energy input increased very rapidly with amplitude. Such tests were made on five conductors, and a rather wide variation in energy characteristics was observed.

Discussion of Data

Each curve of vibration in the wind indicated the maximum amplitude obtained and the wind velocity at which it occurred. Reference to other articles on this subject indicate that the frequencies, wind velocities, and amplitudes obtained during these experiments are comparable with the results of field observations.

Several important differences in behavior between the various types of conductors were brought out by the tests. The character of the surface had a definite bearing upon the amplitudes obtained. The 0.91-in. rope-lay conductor, having a relatively uneven surface, gave small amplitudes throughout, as compared with the 1.0-in. stranded-surface conductor, though loss curves for the two were not very different. (See Fig. 3.) Surface character, however, was not the only factor governing the ability of a conductor to take energy from the wind. Data from the measurements of the 1.4-in. smooth-surface conductor and the 1.4-in. stranded-surface conductor (Fig. 2) are tabulated below:

Loops	Ampl. Cm.	Ratio	Watts	Ratio	Type of Conductor
2	1.71	..	0.0136	..	1.4-in.*
2	0.82	..	0.0056	..	1.4-in.†
		2.1		2.4	
3	0.62	..	0.0116	..	1.4-in.*
3	0.27	..	0.0026	..	1.4-in.†
		2.3		4.5	

* Stranded surface. † Smooth surface.

If surface character were the only governing factor, the smooth surface conductor would give greater amplitude at a given frequency than would the stranded surface conductor. Such, however, was not the case, as evidenced by the above data. The tabulation shows that, at two loops, for an increase in amplitude of 2.1 times, the power taken out of the wind was 2.4 times; that for three loops an increase in amplitude of 2.3 times caused an increase in power taken from the wind of 4.5 times.

The results of the tests were complete in their objectives. Much work is yet to be done on this subject, and therefore the conclusions stated below apply only to the phases specifically covered by these tests. These conclusions are:

(1.) For each frequency of vibration there exists an optimum wind velocity at which the amplitude of vibration for that frequency is a maximum.

(2.) At this optimum velocity the amplitude obtained is controlled by two factors, the conductor losses and character of surface.

(3.) For a given length of conductor, the maximum amplitude obtainable in the wind decreases exponentially as the number of loops increases.

(4.) At a single frequency, the amount of energy taken from the wind increases rapidly as the amplitude increases. For a given length of conductor, the energy to maintain a given amplitude increases very rapidly as the number of loops of vibration increases.

Bill Jones Speaks + + +

about Babel and the Confusion of Tongues

"— — and the Government can't refuse to give citizens any redress against confiscation when it itself takes or destroys their property simply for political purposes. The Constitution plainly - - -"

"Yeah?" said Bill Jones as he slumped down in an overstuffed chair.

"Is Jimmy Dugan's credit good for a glass of beer?" shouted the bartender to the proprietor who was down in the cellar.

"Has he had it?"

"He has."

"It is."

Bill felt loquacious. So the manager settled back also as Bill began to speak:

"As we can see by the daily papers, this country is going straight to the bow-wows—irrevocably and irredeemably; individual citizenship will soon be but an iridescent dream. Big groups of otherwise more or less respectable citizens are fully determined to eliminate all of the commas from the Constitution, and are industriously pecking away at this section and at that one, trying to correct those woefully wrong principles upon which this country was founded and thrived, and which it has more or less followed since.

"The Government is to take from our own shoulders all personal and state responsibilities, until it is approaching a point where if some of us have our way, Uncle Sam will be charged with the express duty of wiping the baby's nose—if it chances to get a cold—while its mother is out lobbying for a statute to compel recognition of the decline of feminity, and its father is making speeches demanding legislation to compel banks to loan money without security and without interest.

"However, the spirit of the times is plain enough—once you understand it—being nothing more nor less than that whatever is, or has been, is wrong, and whatever we want to do, we will do, whether it can be done or not. If the Supreme Court delivers itself of an unpopular decision, abolish the Court, or add two more members who will vote right; if economic law offers obstacle, repeal it; if the law of gravitation offends, amend it.

"Just now it really may look as though we were headed for the rocks. Great groups of voters, representing far more than a mere balance of power, seek in various ways to kick out the underpinning of our country, to secure special privilege for themselves, to destroy our economic structure, to interpose the barrier of religious conviction between fellow citizens, to introduce a puerile paternalism into government, to abandon the tried and true and adopt the chimerical, to ignore experience and history and common sense. And there are more than enough of them to accomplish all of this—*but they won't.*

"Back in other times there were some people who became obsessed with the belief that they also were superior to natural forces and that they could build their way right to the gates of heaven simply by placing stone and brick one upon the other until they had reached their goal of the 'Abundant Life.' The Lord didn't send a devastating bolt of lightning to destroy them; he didn't visit a famine or a plague upon them; he only confused their tongues, and this simple little thing stopped work on the Tower. It is a wise provision of Nature that destructive forces can never combine to completely achieve their purposes. Their language may remain common, but it is their interests which first become confused, and then diversified, and eventually antagonistic.

"The two most important special interest groups today are the farmer and the laborer. The farmer wants high prices for his products and low wages; his present ally, the laboring man, wants low prices and high wages; the farmer wants several subsidies and is not averse to some of his close associates having subsidies, but he is utterly opposed to the ship owners or the industrialists having a subsidy, while the laboring man is opposed to any of them having it. Labor wants all business, other than its own, regulated by the government, but will fight, bleed and die, if necessary, to prevent any regulation of its own organizations; it is opposed to all trusts, save a labor trust, but its erstwhile friend, the farmer, demands a marketing trust.

"And so it goes up and down the entire scale of human desires; each congregation of dissenters acting automatically as a check upon the others, as their interests become confused. So while it is always possible for them to effect a combination, in a negative way, to defeat the established order of things, there will no longer be a unanimity of opinion and purpose when it comes to a division of the spoils so close to their hands, but which they can never quite grasp.

"The structure, the foundations of which were laid two years ago, has risen rapidly. For the first few stories all of its builders were united in a common clan, but already work is perceptibly halting. Father Coughlin, with five million members of his league, opines that it is facing in the wrong direction, and proposes to shift it accordingly. Huey Long, who controls five, six or seven votes in the Senate and is blindly followed by a really large group of people, insists upon adding another story or two, taken from his imagination. Senator Bilbo is sure that the whole thing must be decorated with funny pictures. A lot of people just as sane as you and I are with him. Upton Sinclair, with several hundred thousands of devoted followers of the Epic Plan, would tear down and remove a story or two, and add some very top heavy decorations. At least an appreciable percentage of thirty million Townsendites care little about the general plan, but would alter the foundations so radically that the original designer says it would destroy the whole. There seem to be too many architects. If the building topples, it will not be because of the opposition of its avowed natural enemies, but because of its undermining by its own builders who have confused their own purposes with those of God.

"Of course, nobody is satisfied with conditions as they are now—or ever. Why should we be? When men become satisfied and content with their lot, progress will cease. It is some of the so-called vices—not the virtues—which make the world worth living in. It is through discontent, unrest and selfishness that civilization expresses itself in its highest form, and perhaps selfishness is the greatest of them all. If we eliminate these things, we stagnate.

"No, there isn't any real danger of the present emotionalism getting permanent control of things, though its passing will undoubtedly leave a devastating wreckage behind. The pot may simmer and boil over for a time, but as it does so, it will rapidly quench the flame which caused it. You see that the super edifice which any special group tries to build will tumble down because its own builders will eventually and unwittingly undermine it. All human endeavor travels in circles. Civilization has tried to beat this rule and branch off on a straight line, and will keep on trying to do so to the end of time; but it will never accomplish it.

"And then about this time there may be expected to arise a statesman—or, if the country is especially fortunate, possibly two of them—who, instead of being afraid of the alien vote and the agricultural vote and the capitalistic vote and the industrial vote and the labor vote and the prohibition vote and the anti-prohibition vote and the sectarian vote and the soldier vote and the special interest vote and your vote and my vote, will be concerned only—with the straight American vote."

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Letters...

A Reply to Bill Jones From the People

To the Editor

Dear Bill Jones: Your article in the March issue of *Electrical West*, entitled "Bill Jones Speaks . . . About People," has roused us out of our lethargy long enough to reply.

Perhaps we are wrong, but as the result of many discussions about the much published affairs of our power companies, we believe that the general opinion of the utilities still is very high. We do like the power company people. They are quiet, efficient business people. We appreciate the service they have rendered in giving us the benefit of the finest and best facilities obtainable, at rates which we find very reasonable and altogether fair.

You are right in saying that a few cents more or less in kilowatt-hours makes no difference to the average consumer. We may not have been conscious of it one way or another, because we have taken their excellent service for granted for so many years.

All this ballyhoo and tirade against the power companies is getting in our hair and we are wondering what it is all about, anyway. Of course, under pressure of so much mud-slinging and axe-grinding, the public has paused and pondered over the idea that there might be some truth in these unhealthy rumors; but in pausing and pondering over possible graft in our public utilities, we have discovered ten times as much graft in our politics. We must admit that the politicians who started this rumpus have done us a great favor, because they have started the people thinking and investigating — not only the power companies, but the government—our loud mouthed calamity howlers are very likely to find that their ravings have proved an unfavorable boomerang. Need we remind you that we are now in the throes of a political depression, rather than a financial one?

The power companies have stood up nobly under the strain. They have kept their dignity, and have not hurled any brickbats. They understand their consumers so well they feel sure that their confidence will not be shattered. Remember, our power companies are specialists of long years of experience in dealing with the public.

We ordinary people don't like to strain our mental powers about anything except our regular routine of daily duties—nor should we have to. We hire politicians to run our government, but there are so many oily-tongued liars among them, we make an awfully lot of mistakes. We pay our utilities for their services, and they haven't failed us yet — good service at continuously lowered rates. If we have any money left over from living expenses, we are much more likely to invest it in utilities stock than in government bonds, because we feel it is a better investment. What could be greater proof of the people's faith in the power companies?

Think it over.

Oakland, Calif. P. W.

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Range Servicing Problem Of Utilities Analyzed

To the Editor:

I have looked over the December issue of *Electrical West* and noticed an article on page 44 in reference to standardizing repair parts and would like to offer my comments for what they are worth.

We have a number of test ranges located in families of different sizes and different cooking habits and are watching very closely the servicing cost on these ranges. We also have under our immediate observation in servicing approximately 1,700 Standard Electric ranges, those located in the vicinity of Toledo. These ranges do not require the time of one service man on full time. The cost of parts has been less than 30c per year per range. We have found that when servicing ranges gets into the hands of those who do not understand it, service costs mount very rapidly.

Constant improvements are being made in electric ranges and their parts and it was my opinion that substitution of parts of other makes, coils imperfectly wound and imperfectly connected, bricks imperfectly installed, switches possibly overloaded due to boosting wattages are the cause of most service troubles. Every service call should be handled according to instructions of the manufacturer and only the manufacturer's genuine parts should be used for the range.

Underwriters' Laboratories have approved each individual range with its original parts and substituting other parts of different wattage or a different method of connection would no doubt invalidate such approval.

Standardization which would permit substitution of untested, unapproved replacement parts would be detrimental to progress in the development and approval of the product.

I have no doubt there are service departments of large utilities managed to do very good servicing work, and I do know also that abuses to the product are very apt to creep in when substitute parts are installed.

We have our own accurate method of making coils in such a manner that the resistor cannot possibly be injured. We know what wattage a certain area and mass will safely stand without servicing troubles.

When these wattages are exceeded or when homemade methods of the manufacture or installation are employed, the percentage of the service troubles is sure to rise.

Surely 30 cents per customer per year is not an excessive amount of service. Service can be divided into a number of classifications:

1. Servicing arising from manufacturing faults.

2. Servicing arising from faulty installation including range wiring or house feeders inaccurately figured to carry the load.

3. Servicing arising from the operator's use of the range.

4. Servicing arising from the substitution of parts of another make.

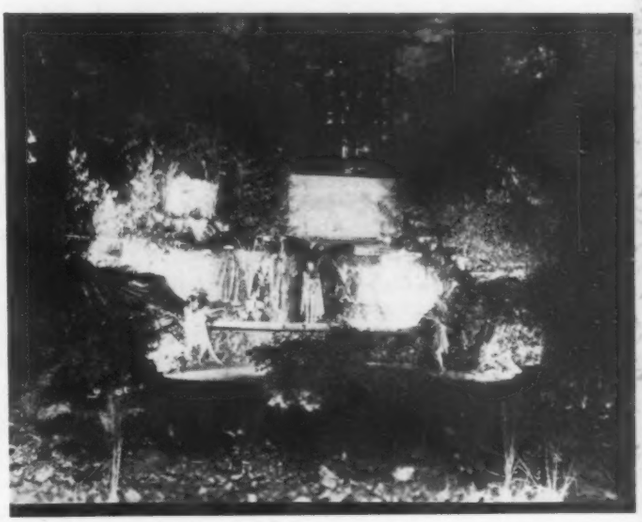
Of these our experience has shown that No. 2 and No. 4 are the sources of greatest trouble.

It seems to me that all service calls on ranges should be classified and the source of trouble specified. To make a blanket statement in regard to the number of service calls in ratio to the number of ranges in use is unfair to the manufacturer and detrimental to the reputation of the electric range.

Charles A. Pierson,
The Standard Electric Stove Co.,
Toledo, Ohio.

Pageantry

When the employees of North Bay division, Pacific Gas and Electric Co., staged a Pageant of Fire in the Redwood forest theater near Guerneville, the "fire" was all-electric. Al Walker, sales manager of the division was director of the spectacular show, and that old stage electrician, Bill Wuelker, furnished the lighting with his Baby White Kitten reflectors. The scene at the right was photographed just as his Satanic majesty, Mephistopheles came to the center of the stage



Business Building Brainstorms + + +

[*What the Industry needs is a brainstorm to destroy the power surplus pest—Arthur Markwart, president, P.C.E.A.*]

Extend Use Of Portable Heaters

23 Electric heat in its many forms is the most important item of future load growth. For full heating of homes we must wait either a practical heat cycle machine which will probably be rather expensive or a very low rate. A small amount of heating, however, can be used with benefit in the average home, —benefit both to the home and to the utility. Portable heaters are standard and well known, low in first cost, and require—for small sizes—no addtional wiring. These have fallen into disrepute and disuse somewhat, as people who have them do not understand their proper economical use and have found them to "run up the bill." This must be corrected first, then, either by extending present sliding scales to include them, or by some of the promotional rates now in vogue. It is not logical to expect people to use electric heat on lighting rates, and we should be frank about it.

An energetic campaign directed on these gives more promise of quickly added load than other simple methods. It should be directed more to educating the home-maker in the correct usage, rather than a selling drive. It should help the customer, and he must be made to understand we are helping him.

Here are some of the points to bring out:

Healthfulness—absolutely no fumes or de-oxidation.

Safe—freedom from fire hazard—no electric hazard (approved types with good cords).

Portable—use any place there is an outlet.

Quick—radiant heat given out as soon as element is hot, in about ¼ min.

Low first cost—extremely simple—element will last a long time but may be easily replaced.

Efficient—absolutely 100 per cent of electric energy turned into heat—heat may be directed where wanted without warming an entire room.

Economical—if used as pointed out. Make it very clear that the company wishes to promote efficient use and that it will not in the long run be benefited otherwise.

The places, methods and limitations of use should be plainly stated. Here is a list of suggestions which may be added to and elaborated on as required:

Bath—call attention to hazard of gas—tightly closed room and steam has no effect on an electric heater. "Make the bath complete with electric heat."

Sick room — warm entire room or only patient. Warm part of body only, as head to relieve cold. Call attention to great harm of gas fumes.

Any small or closed room.

Children — healthfulness, no flame, quick heat in night, may be used to warm floors where children play and which if often cold. In this connection, electric mats or rugs would find a ready market if they were manufactured.

Auxiliary heat — quick heat while waiting for furnace; when only a little is required, as cold mornings; required only a short time, as breakfast room in morning; dressing in cold room; working in a cold room temporarily, or where other heat is not available, as laundry, garage or basement; in connection with other heat, for instance as a foot warmer or where one person in a room desires extra heat; to warm a cold corner. "Radiant heat for cold feet."

"Keep comfortable with electric heat —No fire, no fuss, no fumes."—V.E.L.

Prizes aggregating $50 will be awarded for the best business building ideas to dispose of the industry's power surplus published in *Electrical West* during the six months, May to October, inclusive. Prizes will be awarded by the Northwest Electric Light & Power Assn. and its officers, together with the editor, will act as contest judges. Business-building merit, practicability of application and originality will be the basis of judging and the opinion of the judges will be final in awarding $25 for the best idea submitted, $15 for the next best and $10 for the third best.

In addition *Electrical West* will pay $2.50 for each idea considered worthy of publication by the editors. Suggestions preferably should be limited to 400 words or less, may be published under a nom de plume and should be sent to the editor.

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Entire Free Service For Electric Ranges

24 The caption to this "brainstorm" may be taken, at first glance to be a drastic step to gain a few additional kw.-hr. But let's look into the cost and *profit* of *entire free service.*

First and not least important is the good will of the customer in knowing that when he buys a range it will not cost him a cent for upkeep. Putting this in the words of the customer it "is getting something for nothing" (and who doesn't enjoy that feeling). Thus he will naturally have more confidence in the range and the company selling it. This feature alone will sell 10 per cent more ranges in the same territory as now covered by a charged-for service.

We have seen the customer's angle, now let's see where the company comes off. First, the service on the average electric range over a period of seven years should not be over $5.00. Of course this figure does not include the labor cost. This $5.00 could certainly be added to the list price of the range, as it would not prove much of a selling objection in the face of the free service rendered.

Now comes the labor cost problem. It is almost impossible to give an accurate figure on the labor cost on a range over a period of seven years, as so much free service is now being given. It is a known fact that a service man's time is a money-losing item at best. If we are giving a certain amount of no-charge service to the customer now, why not capitalize on it and advertise that we are giving free service?

The service man's time can well be used in selling new appliances since, as we all know, he has the inside track on getting into the customer's home, and with a few schooled sales tactics can make the service labor balance at the end of the year.

Not only will the kw.-hr. consumption be increased by additional range

sales, but by installing new type units in older type ranges at a no-cost basis for the customer, we can increase the connected load as high as 5 kw. per range. So in summing up the foregoing arguments this looks like a *profitable* way to use some of our surplus power.—Cap.

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Sell More Light To the Rural Customers

25 Recent years have brought various modifications of agricultural power rates in California until now, instead of applying only to power used in pumping irrigation water, the rate may be applied to the power used in the operation of a wide variety of farm equipment such as feed grinders, brooders, incubators, sterilizers and even to poultry house lights.

With all the above liberalization, however, the use of service under the agricultural rate must still be confined to the operation of such appliances and equipment as may be used for producing crops or which are essentially a part of the production equipment. General lighting is, as a rule, still prohibited so far as the power rate is concerned, it must be looked upon in the same light as that which is strictly for domestic use. The result is that instead of using as much light as he really needs, the farmer uses light in his farm operations, around the barn and corral, in the milk house and in the yard generally, with a considerable amount of stringency.

In these days when most of the utilities are trying to market as large a volume of power for lighting as possible, offering inducement rates and advertising good lighting practices, it might not be amiss to call attention to the fact that there is a potential market for lighting in the field of agriculture. It is somewhat doubtful if that field can be penetrated to any appreciable degree under existing lighting rates due to the depressed condition from which the farmer is just beginning to extricate himself.

A trip into almost any agricultural area will disclose many pumping plants located close enough to the barn and corals to make possible the serving of lights from the power installation if lighting were permitted under the power rate (metered on the power meter). Nor would the benefit to the serving company come in the form of added revenue alone. It has come to the attention of the writer that many times when night patrols have been necessary, due to interruptions on distribution circuits, that a well lighted barn yard has served as a signal light to the man on a pole when he closes the switch to test out a circuit, the lights indicating that the circuit was good at least up to the next open switch.

Even if it were found advisable to restrict such an offer to the use of outside lights, floodlights, etc., the probabilities are great that such lights would burn all night and from the standpoint of current consumption should be just as desirable as any street lighting installation.—Jay Bee.

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Clearing House For Industrial Sales Data

26 To best expedite the sales of not only surplus power but any commodity, we might take a few pointers from the years of experiences of others and start at the beginning of the problem if we are to have any appreciable success, and that is to create in the minds of the people the desire for your product. We are told that this item and that item are necessities of life, but during the past three or four years everyone is familiar to what extent purchases of these so-called necessities have been curtailed and not necessarily through the inability of the individual to purchase as shown by sales of items not in the necessity class.

As one of the greatest fields for sales of surplus power is the industrial consumer now on the "utility's" lines, we will confine our efforts to this phase of the problem. How can we create a desire for further use of electric energy with this type of consumer?

The first job is the education of the consumer in the economical application for his present uses. This consists not only of statements of his power costs, but an explanation of the method of purchasing power and an analysis of the uses to which this power is put along with the possible allocation of plant operating costs.

This first step will help to increase the consumer's confidence in the "Utility Company" and its employees and will at least tend to show him that the utility is vitally interested in his using its commodity in the most economical manner.

The real load building job now starts, but having definite information on the plant operation and production, the study of the application of equipment for further uses of electric energy is very greatly simplified.

New methods for doing work now accomplished through other sources of power and more economical types of equipment can be brought to the attention of the consumer along with cost analyses of operation, but to do this and have all available information, some central source for the dissemination of this type of information on equipment should be established and maintained by the utility.

The various manufacturers of equipment which consumes electricity should welcome a set up of this kind, and we feel sure that 100 per cent cooperation would be obtained from all sources. —W. A. Bouvé.

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Editor's Note: Several "brainstorms" have been received in which the authors simply advocate that rates be reduced to help rid the industry of the surplus power pest. Such suggestions will not be considered unless they involve original revisions or simplifications of rates which will encourage use of more electricity.

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"Left Over" Heat and "Off-Peak" Cooking

27 When the economical housewife turns off her electric range, she hates to see the remaining heat lost. This feeling might be capitalized upon by suggesting a little longer range of planning in her cooking procedure, and the suggestion strengthened by some practical ideas. And if the "longer range" planning develops more off-peak cooking, the idea is worth pursuing, so here goes.

Milady now *must* use her range more heavily during exact peak time. Show her how to use her range to escape the "left-over" heat losses, and psychology will assist her desire to economize, resulting in more of her cooking being done before and after the peak period.

Tell her to plan to cook her cold-service desserts in continuity with her dinner dishes, to save the heat loss. Thus she will cook these dishes before or after the peak load. Remind her that mid-summer menus call for cold meats that can be cooked more comfortably in the evening, and can follow her dinner dishes (all of which she cannot escape from cooking) thus saving heat—and running into the lower load period.

Give her a bit of advertising, labeled so she will know it doesn't propose to do anything but point out how to use her present equipment to better advantage. Shoot in some recipes of the kind of dishes that can be cooked long before service time. Suggest she use the cool of the evening, in summer, to cook for the next day.—Ralph S. Bowdle.

Visual Chart Helps Explain Pump Performance

By V. A. BLOXHAM
Power Salesman, Southern California Edison Co.

IT HAS long been the practice of engineers, in explaining the functions of technical apparatus, to show the relationship of variables by means of graphs or curves. To the engineer, a much more comprehensive picture is presented in this manner than by lengthy explanations and tables of mathematical values.

Where more than two variables are involved, additional curves must be plotted—usually on the same chart. Thus several graphs with values interrelated and depending upon each other for their trends are often imposed upon a single curve sheet. The general result is an imposing array of crooked lines most confusing to a person not intimately familiar with that particular engineering application.

Fig. 1 is a deep well turbine pump performance curve having five such graphs plotted against "gallons per minute." The information to be gained through an inspection of this chart by the average user of such a pump as that shown, is far from reassuring. In order to give a quicker understanding of pump characteristics so that the farmer, the student or the "occasional" engineer may readily grasp the significance of lowering water level and of pump efficiency, a slide rule chart for dramatically illustrating these characteristics has been designed.

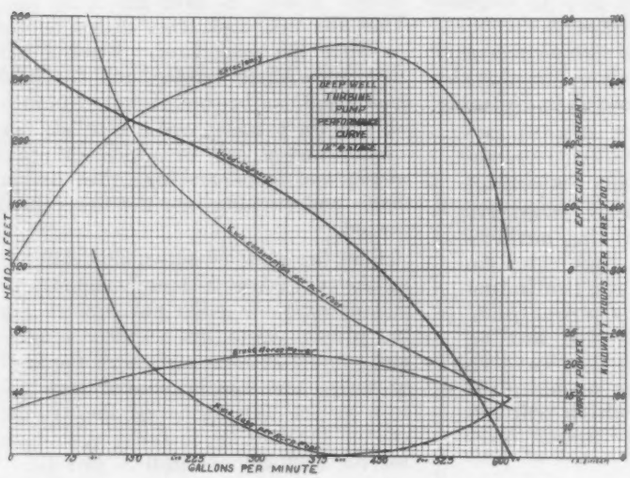
Fig. 1—Deep well turbine pump performance curve

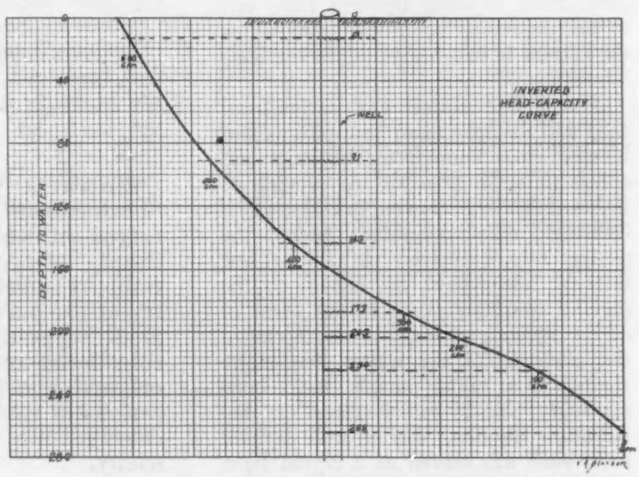
This device, illustrated in Fig. 3 was developed entirely from the data shown on the pump performance sheet in Fig. 1. It should be noted in Fig. 1 that the curves have been extended beyond the practical limits of the pump in question to the shut-off point on one side and to a hypothetical point of no head on the other side. This was done to show fully the general characteristics of centrifugal pumps from one extreme condition to the other. As in all such pump curves, the graph marked "head-capacity" is plotted against an abscissa scale of "gallons per minute" and an ordinate scale rising from zero and designated as "head in feet." The usual explanation of a head-capacity curve is that as the head rises the capacity diminishes. Conversely, as the head lowers the capacity is increased. While this is technically correct it is never exactly clear to the average farmer just how the head increases. He can, however, understand that the water may go down in his well.

The depth to water, measured from the ground level, is the actual problem with which he is continually confronted, and the situation is immediately clarified when the rising ordinate value is converted to lowering ground water levels—a familiar value. The transition of these values is illustrated in Fig. 2, which shows a water well and the relation of variations of water levels in the well to the head-capacity curve of the pump. It must be noted that this head-capacity curve is not changed in form, but is inverted so that the shut-off point occurs within the lower reaches of the well just as it does in actual practice. This manner of dealing with simple illustrations removes the necessity for over-using the imagination and yet the technical function of the curve is completely retained.

The slide rule chart shown in Fig. 3 is 22 x 30 in. and consists of two parts —the background and the transparent slides. The background consists of a rigid material, the front surface of which is dead black to provide contrast and to hide the figures on the transparent slider. On this black background, in a predetermined and exact position, is imposed the drawing of a complete direct-connected electrically driven deep well turbine pump. The pump bowls, suction, column pipe, discharge pipe and head and the electric motor are shown in bold detail and constitutes a familiar picture to the farmer, pump purchaser or student. The slider consists of a transparent material on which first the inverted head-capacity curve is plotted as a series of points over which the pumping water level in feet is shown. Those points were taken which would coordinate with even hundreds of gallons per minute of pump capacity. In addition, five horizontal columns of values are written on the transparency. These values, reading from the top downward, are brake

Fig. 2 — Inverted head-capacity curve to demonstrate effect of lowering water table on capacity





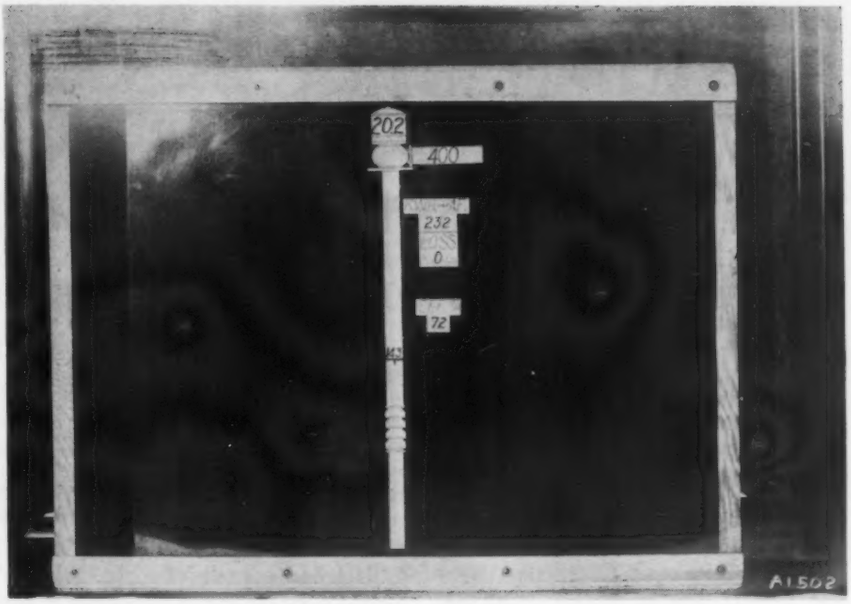


Fig. 3—Slide rule chart for graphically and dramatically translating data from curves in Fig. 1 for easy understanding by agricultural power customer

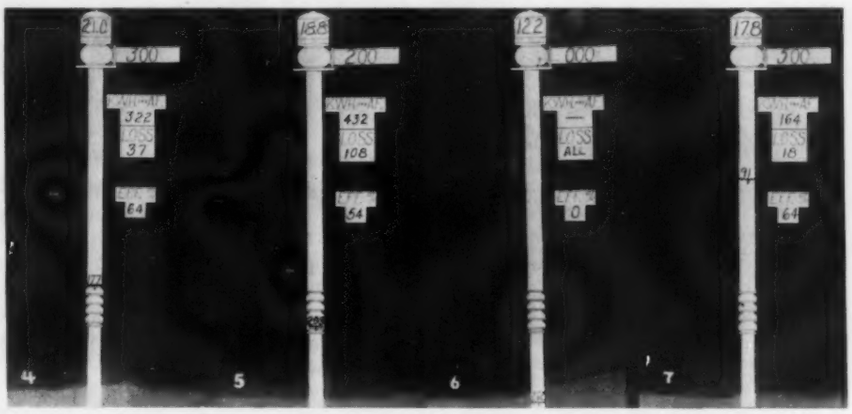
horsepower, gallons per minute, kilowatt-hours per acre-foot, loss in kilowatt-hours per acre-foot, and pump efficiency.

Guide grooves in the background frame allow the transparency to be moved easily to any position with respect to the picture of the deep well pump on the background.

The position of the slider shown in Fig. 3 is the correct design point of the pump, i.e., the point of highest efficiency of the unit. A mere glance at the situation presented will reveal all the salient characteristics of the installation, as well as the performance of the pump bowls at that point. Four hundred gallons of water per minute is flowing out of the discharge pipe as shown by that value written on the pipe. On the frame of the electric motor is written 20.2, denoting the brake horsepower required. Across the pump column is a line showing the pumping water level in the well, which is 143 ft. Note that this level is well above the bowl setting, indicating proper bowl submergence with a safe margin. The inserted white backgrounds give additional information as to the operating values. The pump efficiency is 72 per cent, which is the maximum efficiency for this particular pump. The kilowatt-hours of metered energy required to pump one acre-foot is shown as 232. There is no recoverable loss in metered energy, as is indicated by the zero in the "loss" column.

A tabulation of these values are as follows:

Capacity in g.p.m.	400
Total pumping head in ft.	143
Brake horsepower	20.2
Pump efficiency in percent	72
Kw.-hr. per acre-foot pumped	232
Loss of energies in kw.-hr.	0



Figs. 4-7 (left to right)—Slide rule settings to show the effect of lowering water table or increased pumping head on output, kw.-hr. consumption and efficiency

These same values may be read at the corresponding point on the curves in Fig. 1.

Shifting the slider to the left one position, as in Fig. 4, changes the situation materially. The capacity has been reduced, the water level has receded nearly to the pump bowls and the horse power increased, resulting in reduced efficiency and increased consumption. The plant will operate at a loss of 37 kw. hr. per acre-ft. The slider moved as in Fig. 5 shows the water level in a bad position, with respect to the bowls. This position illustrates most dramatically the effect of lowering water levels on pumping equipment. The necessity for a column extension is apparent; it is delivering only half its rated capacity and the power loss is one-fourth the total energy consumption. Fig. 6 illustrates the factors surrounding a condition where the water has dropped (head increased) to the shut-off or static point of the pump.

The succession of positions shown in Figs. 3 to 6 demonstrates by the visual method how there is a steady approach toward the Fig. 6 situation as the water recedes from that level for which the pump was designed.

Fig. 7 shows the slider moved to the right from Fig. 3 position and indicates the performance when the water level raises above the point of design. Although the capacity is increased, the efficiency is lowered and an operating loss is sustained.

More points on the performance curve are used than the photographs cover. Also any reasonable number of points can be plotted on the transparency and the values varied to suit can be plotted on the transparency and the values varied to suit any size or design of pump bowl. The pump cut, on the background, is not drawn to scale and therefore may be used to fit any performance that may be depicted on the transparent slider and still retain the correct relationship to produce the desired visual effect. It may also be adapted to show other factors of water lifting either with or without the pictorial background.

The use of this device has solved one of the knottiest problems the author has ever attempted in farm educational work. It is highly desirable that the agricultural student, the farmer and the prospective pump purchaser of deep well pumps have a general working knowledge of pump performance, and it was with this end in view that simplification of the subject was attempted.

The chart mechanics described in this article and the context of the article itself are copyrighted.

The Wonders of Electricity from the Congressional Record

NO one will say, least of all Electra, that electricity has not become mixed up in politics. So much so that politics is now in the hair of the electrical industry. Down at the Fresno conclave of the P.C.E.A. Electra's husband heard something about "Politics and Electricity" from one speaker that is worthy of quotation and repetition. Here it is:

"When people generally understand the simple facts about this business, they will not be impressed by the claptrap which emanates from the vocal cords of Capitol Hill. As a sample of the dense ignorance which is exposed when a congressman undertakes to discuss the electrical industry, I give you some excerpts from the Congressional Record of March 13 from the extended remarks of the Honorable John E. Rankin of Mississippi. He said:

" 'Mr. Chairman, we are in the beginning of a new era in the development of our civilization; the dawning of the electric age . . . Electricity is a divine gift. It was offered to man for centuries — yes; for ages — before he ever learned to harness it or comprehend its worth. Throughout uncounted centuries Almighty God wrote His name in fire on the midnight darkness. His thunders hurled their recurring challenge to come and investigate. Throughout succeeding ages, man stood appalled and viewed with fear and trembling this terrible, scintillating, awe-inspiring, and sometimes death-dealing apparition.'

"Mr. Rankin then pays a tribute to Benjamin Franklin and Thomas Edison, and then skips lightly to 1935 and the New Deal. Pardon me for repeating his open statement—it is so ingenuous and naive—'We are in the beginning of a new era in the development of our civilization; the dawning of the electric age.'

"Then he says, 'We are going to keep up this fight until we place electric lights and power in reach of every human being in America, at rates they can afford to pay.'

"Fifteen or twenty minutes later he concludes those fervid remarks with the following forensic tidbit, 'Whenever I see the glow of an electric light, whether it be in the factory window, over the merchant's counter, or in the humblest cabin home, I can say in my heart that I have helped to lighten that man's burdens.'

"If I had enough influence with Mr. Rankin I would like to invite him as my guest to visit Mt. Wilson and gaze out on that night scene which is familiar to us all, and I would like to say to him, 'What you see below is the result of unhampered private initiative. Those lights are produced by hydro-electric power which was first harnessed in 1892, supplemented by steam power, which is so efficient that it can compete on an even basis with hydro power. Those farms have used electricity for irrigation since 1896. These people pay for electricity at rates which compare very favorably with any that the New Deal has proposed. Furthermore, the rates include a very substantial amount for taxes. Out here in California we have lived for forty years in this new era which you have just discovered. I don't want to hurt your feelings about the way your heart is going to pound with pride when you see the glow of an electric light in the factory, the store and the cabin home, but I owe it to myself and the industry which I serve to remind you that some of those lights have been burning since you were in high school, and, furthermore, I think you will find that as you go deeper into this matter of hydro-electric power, you will discover that the best sources already have been harnessed and the reason others have not been developed is because they cannot compete with steam power at the present prices of fuel. I am sorry, Mr. Rankin, but this speech of yours would have been much more appropriate in Cleveland's administration."

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WE are an impatient race; nothing ever progresses as fast as we should like to have it. Got to grumbling the other night about the long time it seems to take the public to appreciate the really fine qualities of electric cooking. Then it occurred to me, or maybe it was to Electra, that measured by some of the other fine things of life the electric range isn't doing so badly. Of course it is true that the public just gobbled up the radio and the refrigerator, almost from their inception, and that the automobile, after a slow start, made phenomenal advancement. But the airplane is progressing rather cautiously in public acceptance, despite its sensational mechanical advancements. And our old friend lighting, after the first drop cords were hung in place, almost stood still for many years and is just now getting a second wind.

Superb music, the best books, the most inspiring painting, the finest cooking—perhaps it takes discrimination to appreciate them, and discrimination only comes with patient education. Certainly with the present inducements to try electric cookery most of the barriers to its wider use have been swept aside. It may be up to this industry to show people that there is such a thing as taste. Personally, I think I should advertise it this way: "Those who make an art of fine cooking distinguish the difference."

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AN old man stood on the street corner selling the Townsend Plan Weekly. He could not, in his enthusiasm, understand why I had to smile paradoxically when he called loudly, "This is the cleanest little paper published, folks. Tells just what they're doing down at Washington!"

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JUST knew this imitativeness would get the gas folks into a tangle. Until they started to put electric clocks, lights, and convenience outlets on gas ranges theirs was a blissful life, without a care in the world. But when they started to string wires on their ranges, then the fun began. Electrical inspectors began to cock their heads to one side as the little lamp cords dangled carelessly over hot chimney vent pipes. Now one city inspector has ruled that all wired gas ranges must be run in conduit the same as an electric range.

If this goes on and the installation of a gas range becomes as complicated as an electric range, competition should be more equalized. With the same handicap on both, my money is on the electrics.

Cooperation on Parade + + +

[*Forecast of forthcoming cooperative merchandising activities, and review of activities in progress or completed, a summary of cooperation at work throughout the West*]

Radio "Hams" Advertise San Diego Exposition

SOME idea of the publicity value of the radio amateur can be gained from the results of the unusual and spectacular advertising of California-Pacific International Exposition, San Diego, by the Radio Amateurs' Association under the sponsorship of the Bureau of Radio & Electrical Appliances of San Diego County. Nearly 10,000 radio message blanks were picked up at the dealers' stores and over 4,000 messages were turned in to be transmitted. These messages were left at the stores and were sent out promptly by the Radio Amateurs' Association members over short wave transmitters. They were picked up not only by the stations near to the intended recipient but also in every state and county in the Union. Reports have been heard of these messages reaching those to whom they were addressed in eight foreign countries.

A provision of the offer was that each message contain whatever the sender desired so long as a message relative to the San Diego Exposition was also included.

From a human interest standpoint the messages sent out were a remarkable and unexpected thing. Personal invitations to relatives and friends to visit the fair and to be the guests of local residents were sent in surprising numbers. Surely San Diego will be a host to visitors from all over the world during this summer.

For the dealers the program brought unusual attention to short wave receivers and resulted in many sales, developed from among those who brought in messages to be sent.

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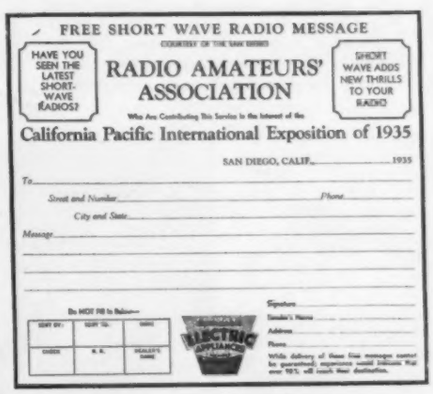
San Diego "Chilled Food Institute" Repeats

SCHEDULED for successful repetition was the famed "Chilled Food Institute" which the Bureau of Radio & Electrical Appliances of San Diego County last year conducted with such beneficial effect to the cooperating dealers in that territory. This year the Institute, scheduled for May 1st to 4th, is to be held in the Pompeian Room of the San Diego Hotel.

In preparation for this Institute extensive advertising was building up the interest all during the month of April. Radio advertising, billboards and newspapers were used in the promotion.

Inviting YOU..
NEW HAMPSHIRE
CONNECTICUT
VERMONT
MAINE
MASSACHUSETTS
RHODE ISLAND
TONIGHT
A SPECIAL salute to the New England States in an unique program will go on the air over KGB at 8:45 announcing too, how you can send a free SHORT WAVE message to any state in the United States or to its possessions.
Have you a friend or relative to whom you would like to send a personal message, and perhaps include an invitation to visit the California Pacific International Exposition? The San Diego Radio Amateurs' Association have made this possible for you. There's no obligation... tune in tonight and learn how. Enjoy an unique program.
Every radio dealer has been supplied with free radio message blanks for your convenience.
BUREAU of RADIO & ELECTRICAL
APPLIANCES of SAN DIEGO COUNTY
600 Electric Building

Advertising of the radio messages were centered around a Salute to a particular region on a particular night The local newspaper advertising, a copy of which is shown above, featured the salute and the radio program for that evening and was directed to the people of that region



For the Institute itself a number of attention-getting entertainment features were planned, among them a television stunt and a number of demonstrations and cooking lectures. Tie-in with local food dealers was also contemplated by J. Clark Chamberlain, secretary-manager of the Bureau.

"Doc" Allison Makes Extended Western Tour

Dr. George W. Allison, field representative, Edison Electric Institute, has just completed an extended tour of the West making his usual eloquent addresses both to the industry and to the public. Fortunately on this trip Dr. Allison was able to spend more time in this region and hence his stirring and dramatic messages on the benefits to the public of the electrification of the home were brought to larger audiences and to far more points than in any previous visit.

Coming by way of El Paso, Tex., he made two addresses there, one to a large group of wholesalers, manufacturers and dealers, and another, a special radio address, over Station KTSM. He then spent some time in southern California visiting various divisions of the Southern California Edison Co., in each case giving from one to three addresses each day. He also covered the various divisions of the Pacific Gas and Electric Co. and San Joaquin Light & Power Corp. and returned East by way of the Northwest where he again talked both to groups of people within the industry and to the public.

Dr. Allison's talks to the industry centered around the personal interest that every man in the industry has in the menace which is contained in the Wheeler-Rayburn Bill to disorganize utility holding companies. In his dramatic fashion he also gave his listeners much sales-building inspiration and many excellent selling ideas by his dramatization of what he calls "the servants in my house."

Upon the urgent requests of many leaders in the industry Dr. Allison has promised to return to the Coast again in the fall.

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Mountain Region Launches Big Cooperative Program

A $50,000 promotional fund, allocated to the cooperative business building plans of Electrical League of Colorado and Rocky Mountain Electrical Assn., was announced in April. This large sum became available subsequent to the recent reorganization of the Electrical Industry Business Development program which R.M.E.A. and Electrical League have been fostering during the past twenty months, whereby a powerful advisory council, headed by Guy W.

Faller, vice-president and general manager of Public Service Co. of Colo., was established to supervise activities of the two groups.

Electrical League and R.M.E.A., together with Public Service Co., divide underwriting responsibility on approximately a 50-50 basis. Activities will directly benefit every electrical appliance dealer, wholesaler, contractor and utility in Colorado, Wyoming and New Mexico. Newspaper advertising and radio broadcasts, designed to compel attention and stimulate business throughout the mountain territory, will be among the instrumentalities used. Broadsides of *Electri-News* and *Electri-Gram*, spokesmen for R.M.E.A. and Electrical League will be other agencies.

The various sub-divisions of the Tri-state organizations are assigned definite budgets: Electrical housewares, $2,025; electrical refrigeration, $1,600; lighting —domestic, commercial, industrial, highway and signs—$3,000; wiring, $2,025.

George Bakewell, Jr., manager of Electrical League, and George E. Lewis, executive secretary of Rocky Mountain Electrical Assn., are coordinators of the enterprise. Lewis' special assignment is supervision of electric range, electric refrigeration, electric housewares and power sales divisions; Bakewell's: Lighting, wiring, air-conditioning and radio promotion. To them is assigned responsibility for timing all phases of the program in such manner that all communities in all three states shall function simultaneously on each successive activity.

Electrical refrigeration, according to the schedule just issued from Electrical Industry Business Development headquarters in Denver, will be featured in May, June and July, with an appeal that the public "Buy from stores equipped with adequate electrical refrigeration." Electrical kitchen and table appliances occupied the spotlight in April, and are slated for a big play in May, September and October. The June Bride, Mother's Day, Christmas, Thanksgiving Day, etc., call for special observances and promotions on the schedule issued jointly by R.M.E.A. and Electrical League.

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• Something Permanent to keep as the result of a talk is to be provided members of the Electric Cookery Council of southern California during this year's program. A mimeographed copy of the feature talk of the evening is to be distributed to all members as a means of increasing their information and sales data. Another feature of this year's work is a series of visits to industries and plants which has both a social function and a publicity one in that it will help to publicize the Cookery Council to the industries and businesses of the region, according to Chet Dye, president of the Council.

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Triplets

Realizing that under the impetus of the Better Housing Program kitchens are being considered as a unit rather than from the standpoint of separate appliances, the Bureau of Power and Light installed three complete kitchens in its display room at 211 South Broadway, Los Angeles. These kitchens were intended to give prospective purchasers ideas of how a complete kitchen ensemble appears and to help them visualize a proposed improved kitchen of their own. The Electrocraft kitchen, designed by Louis Singleton and sponsored by Standard Electric Stove Co., Frigidaire Corp., Elgin Metal Cabinet Co. and Conover Dishwasher Co., was shown in these columns last month. Shown below are the General Electric kitchen, sponsored by the George Belsey Co., and the Westinghouse kitchen, installed by the Greater Broadway Department Store and the Westinghouse company

Dealer Salesmen Train in Council Cooking School

IF the salesmen and dealers in the Los Angeles area do not develop into some of the best range sales producers in the country, it will not be for want of opportunity. That opportunity is a series of three-day sales schools being conducted by the utilities in that region in cooperation with dealers and distributors.

Feeling that in a program which calls for all sales of ranges to be made by dealers only, the greatest chance of failure lies in the inadequate sales preparation of dealers and their salesmen and the lack of direction of their effort, this method has been evolved by dealers and utilities together to convert what ordinarily would be a weakness into a strong factor in the program. These sales schools have been run on three-day schedules beginning in February. They run on Wednesday, Thursday and Friday of each week until April 26. Schools begin at 2 p.m. and close at 9:30 p.m. with the exception of Friday, which runs from 1 to 5 p.m. Strict requirements are made for graduation and entry and the classes are kept to a maximum of twelve at one time. So far the experience has been that no one misses any one of the classes. If for some reason one class is missed, that student reappears at the next week to make up for it of his own volition.

Requirements for graduation are attendance at all sessions, the building of an individual handbook, securing of testimonials, the presentation of a written talk on the advantages of electric cooking, the assembly of a complete prospect file, and the assembly of a complete information file. The practicability of the course is further enhanced by the fact that the students

prepare, cook and eat the supper which they themselves have set in the automatic range during the afternoon.

The course is exceedingly thorough and covers every element of construction and operation of the electric range. It also points out the selling opportunities and prescribes a definite scientific basis for selling. Class work is divided between actual demonstrations in which a member takes part, lectures and the acting out of selling problems such as approaches and the overcoming of various obstacles in the sale.

One of the most vital factors in the course is built up around the assembly by each student of his own individual handbook made up from clipped photographs and drawings pasted together in a scrap book of his own in a logical order to be used by him convincingly and enthusiastically when talking to his prospect. This technique has been developed by Lloyd Bowles of the Southern California Edison Co., who has made an outstanding success of the use of such a method. He has sold over 500 ranges from the use of this book alone. If the book is a home-made, homely affair, the salesman can use it with a sense of personal pride in its assembly and with far more convincingness both to himself and his prospect than the usual beautifully prepared manufacturer's handbook.

Staff of the schools who conduct the classes consists of John Stigman and Chet Dye, of the Bureau of Power and Light; H. Langlois and H. H. Douglas, of the Bureau of Power and Light and Edison company, respectively, who talk on rates and their application; Lloyd Bowles and C. W. Preston, S.E.R.A., instructors in selling technique.

Sponsor of the schools is an educational committee of the Electric Cookery Council of southern California, of which William Krueger is chairman. The remainder of the committee consists of John Stigman, Lloyd Bowles, Cleon Brown, Harold Conklin and John Adams.

Classes are conducted at 120 East Fourth St. where facilities are provided by the Bureau of Power and Light for the schools.

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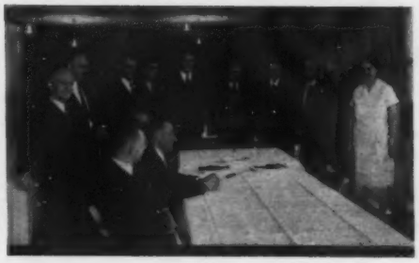
Valley Lighting Crew Try New Appointment Method

IN a country in which front doorbell pushers are so numerous that housewives are beginning to revolt against them, the problem is to gain appointments for the lighting advisers who come with the sight-saving story. Jack Hammond, lighting sales engineer for the San Joaquin Light & Power Corp., thinks he has a solution which will meet the problem.



One of the electric range selling classes conducted by the Electric Cookery Council of Southern California just as the steaks are being dished out by teacher Anne Martin. John Stigman, an instructor, and Art Elliott, assistant business agent, Bureau of Power and Light, Los Angeles, are at the left

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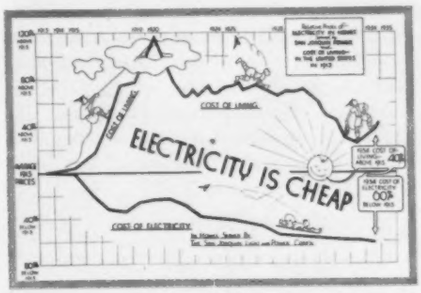
The company has obtained 50 sight meters which it is willing to loan to its customers to "play with" in their own homes and determine for themselves the relative merits of their own lighting. In order to get customers to make this test a letter is sent to them personally asking for an appointment by phone when the office calls them at a definite hour. When an appointment is not possible,



Lively treatment gave life and action to an otherwise dry chart and helped to bring home pleasantly to the public in the territory of the San Joaquin Light & Power Corp. the real economy of electric service

an offer is made to leave the sight meter for the customer to try for herself for one night.

The sight meter is then delivered and picked up the next day. At the time that the sight meter is left, a pamphlet, "They Can See in the Dark," is left with the customer, as well as other literature of a similar nature. Where the customer will not even take the sight meter, a pamphlet is left, together with a lighting tape measure. Bills are checked later to see whether the literature has had any appreciable effect in increasing the load.

Demonstrators who obtain an appointment have been getting phenomenal results. At first these appointments were not difficult to get but increasingly they have been harder to obtain.

Results obtained from the lighting demonstrations are well indicated by the fact that in 1933 200 reflector floor lamps were sold in the Fresno store of Valley Electric Supply Co. and in 1934, 500 were sold. Dealers, too, all reported greater sales of the reflector lamp. It was found on a check-up that for each contact made by a lighting demonstration the equivalent of three-quarters of a reflector floor lamp was sold, or in other words, a lamp to three out of four calls.

Since these home demonstration girls themselves do not sell the equipment but refer the customer to a dealer, this work has benefited the dealers of the region. On lamp replacements, the girls carry a stock as an accommodation to the customer. Where the customer needs replacements or refilling of empty sockets, the girl accommodates the customer by selling her the lamp which she needs and finds out from whom she ordinarily buys them. Then the demonstrator goes to that dealer and replenishes her own stock, thus adding to the business of the dealer.

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All Cooperate in Greeley Appliance Show

A four day show—March 20, 21, 22, and 23—promoted by the Home Gas & Electric Company, Greeley, in cooperation with all the electrical dealers of the city, not only enjoyed a large daily attendance but very definitely stimulated interest in things electrical, according to L. R. Storey, manager.

Extensively advertised through the medium of newspapers, window cards, movie trailers and personal letters to 140 rural school superintendents, the show also received valuable publicity in the leading local paper. This paper, the Greeley *Tribune-Republican*, donated the large high school auditorium and ran daily stories on "Willie" Vocalite, Westinghouse mechanical man, whom J. M. Barnett of Westinghouse exhibited.

Through the whole-hearted cooperation of the newspaper in furnishing the auditorium, the power company in furnishing the electricity, and dealers in furnishing electrical displays and properly manning them and their creation of a fund to defray advertising expense, the show was made possible, bringing to the residents of Greeley and vicinity what was declared to be the most extensive show outside of Denver in the state.

Dealer's expense, time and effort in putting over the show so successfully were well repaid by the many orders for electrical accessories taken on the floor and the large lists of prospects developed for future calls by their respective salesmen.

Industry Gets "In Gear" for Year's Selling Activity

GEARED to an opportunity for electric appliance sales in northern California estimated by careful market research to be $122,800,000 for replacement of worn or outmoded appliances and $72,500,000 in new appliances, the Pacific Gas and Electric Co. announced its 1935 business development program at a series of dealer and industry mass meetings in each division of the company during the past month. In announcing this broad program, Vice-President in Charge of Public Relations and Sales, R. E. Fisher, placed in the hands of all dealers and manufacturers and distributors a handsome brochure setting forth the market opportunities, the programs and policies, and the intended advertising program of the company which will back up this selling program during 1935.

The title "In Gear" has been exemplified by a symbol representing three gears; the first gear is that of the manufacturers and jobbers; the third gear is that of the appliance dealers; the middle gear which is in mesh with both is that of the P. G. and E. sales plan. This symbolizes the method by which the company plans to carry the impetus of selling from the manufacturers and jobbers through its sales plan to stimulate and assist appliance dealers to capitalize upon the vast potential market which has been found to exist.

The booklet first shows a definite business condition improvement graphically charted. The market analysis reveals that during 1934 retail sales increased 15.3 per cent, wholesale trade improved 20.2 per cent, agricultural implement sales increased 66.9 per cent and electrical supplies increased in sales 35.6 per cent. The survey also reveals that the basic income from farming, dairying, poultry, live stock, manufacturing, lumbering, mining and fisheries in 1934 has materially increased.

For the past year each of the company's salesmen has been required to complete a stipulated number of surveys each week, using standard forms of inventory report. These show the appliances or equipment in use in the homes of consumers on the system, whether they are in good or fair condition or are ready for replacement. From approximately 160,000 reports in 1934 a potential market for appliance dealers in the territory was determined. On the replacement market alone the following figures as to total appliances now in use gave an estimate of the possible field:

Electric ranges	49,260
Water heaters	19,381
Major air heaters	8,799
Washing machines	210,153
Ironers	28,827
Vacuum cleaners	281,880
Refrigerators	182,560
Radios	428,217

This appliance market is estimated as representing a potential business of $122,800,000 in electric appliances alone.

The surveys also revealed a demand or a need for new appliances among consumers not now fully equipped. This market has been estimated as follows:

Electric ranges	21,780
Water heaters	22,301
Major air heaters	4,269
Clothes washers	129,407
Ironing machines	163,696
Vacuum cleaners	135,405
Refrigerators	183,480
Radios	52,078

This market represents about $72,000,000. Installation of these appliances is estimated to represent about $4,000,000 worth of work for electrical contractors. These potentials do not include any amount for new construction or for commercial, industrial and agricultural requirements.

Sales Plan

The Pacific Gas and Electric Co.'s pinion in the gear train is represented by its 1935 sales plan. The principal features of the plan are (1) the promotion of domestic consumption and appliance use, (2) promotion of commercial, industrial and agricultural consumption and appliance use, (3) promotion of street lighting and other power uses, (4) comprehensive advertising program, (5) the market analysis and appliance survey and (6) cooperation with dealers and manufacturers and jobbers and the gas and electric appliance societies.

The district plan of surveying will be continued and extended over the entire system this year. In addition to the load building object, the survey plan is designed to develop a closer relationship between the company and the customer and to improve the efficiency of the company's service. The plan also will promote sale of those appliances which the company sells direct as well as gather systematically information as to prospects for appliances not sold by the company which can be distributed through dealer channels for further action.

Aside from the appliance development, the company is aggressively soliciting lighting, heating and power utilization among its customers. This is done in cooperation with the contractors and dealers in appliances and equipment to serve these markets.

Domestic lighting equipment is sold by the company under certain conditions where introductory merchandise is required. The purpose, primarily, according to Mr. Fisher, is to improve lighting service to the home and to induce increased use of better lighting equipment. This has been shown in the past to have reflected in larger sales of better types of lighting equipment on the part of all dealers.

In the agricultural field, pump testing by company engineers to increase the efficiency and economy of electric pumping, and advisory service to assist farmers in the use of newer forms of electrical equipment, results in the sale of much of this equipment from dealers to the farm customers.

Air conditioning will also receive considerable impetus this year from company activities. Street lighting and commercial uses of electricity will also be fostered along the same lines.

Featured in the advertising for the year will be the one-half off for extra electricity offer which went into effect last December and which will remain in force until December of this year.

Calendar of Events

A sales promotion calendar month by month is included in the plan. The months of January, February, March and April followed this schedule, featuring electric air heaters in January, lighting and air heaters in February, lighting in March and ranges and water heaters in April. During May electric ranges and water heaters will continue to be featured, in June domestic lighting, in July ranges and water heaters again, as well as in the month of August. September, domestic lighting will be featured, in October air heating and lighting, in November auxiliary electric air heating and in December the same will be featured.

In addition to this the special campaigns of the appliance societies will be cooperated with in every respect. In August a washing machine campaign is contemplated and in September one on ironing machines. During the last two months of the year electric appliances for Christmas will probably be featured by the societies. At the present time a refrigerator campaign is in progress.

The advertising and promotion part of the program is one which will rebound to the benefit of everyone in the electrical industry with goods to sell. Space in 282 newspapers, poster boards

in 101 cities and towns, truck banners on 599 trucks and cars, bill stickers to 6,323,400 consumers, direct mail pieces to the total of 1,080,000, dealer bulletins, magazine advertisements and stores in the P. G. & E. "Progress" distributed to 500,000 consumers, are all features of the advertising mobilization which backs up the selling effort of the industry.

Displays and demonstrations in all of the offices of the company as well as participation in fairs and in events of that nature will give visual and actual samples of the benefits to be derived from electrical appliances to the customers of the company. Most of these demonstrations are arranged cooperatively, the dealers in the community supplying their merchandise to put on display in the power company offices in cooperation with the company.

The specific quota for the year 1935 in electric appliances has been set up as

Ranges	4,000
Water heaters	3,000
Major air heaters	2,000
Auxiliary air heaters	9,850
Domestic refrigerators	27,000
Apartment kitchen refrigerators	1,450
Dish washers	100
Washing machines	26,150
Post-type ironers	2,400
Regular-type ironers	4,300
Radios	68,900
Vacuum cleaners	21,400
Sewing machines	13,000
Mixers	20,000

representing a total estimated retail merchandise volume of $12,559,400 with an installation business estimated at $274,250.

Complete Frankness

As a further evidence of the complete frankness and wholesome cooperation of the company in the new campaign a copy of the operating details of the business development program was given to everyone interested in it. This contains the domestic, commercial and power sales programs. All details as to objectives, scope of plan, policies, prices, terms, carrying charges and specific allotments of direct sales by the company and quotas to be obtained are given in detail in that manual.

Dealers in particular will find parts 3 and 4 of especial value and interest. Part 3 gives the standard appraisal procedure for the turn-in of second-hand equipment on a new sale. Part 4 handles the details for the allocation of prospects obtained by the company and distributed to dealers. All dealers who sell appliances, which are listed under the specifications set up by the Underwriters Laboratories, are eligible for participation in the plan provided they agree to solicit promptly the prospects given them and to offer terms of payment to those who cannot pay cash. Dealers must also continuously display appliances and report sales promptly. Dealers also must make no confidential prospect arrangement with any company employees and must report promptly each month sales of appliances listed in the dealers' confidential monthly report.

The new sales program met enthusiastic response in all districts where it was explained and outlined to large dealer and industry meetings. Throughout the northern California territory of the Pacific Gas and Electric Co. aggressive selling is already under way and each dealer is setting forth to obtain his share of the $19,000,000 total market in gas and electric appliances which the company has outlined as a reasonable potential for this year.

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Reproduction of the campaign 6-color poster, which will be used by dealers in window and store displays

Central California to Feel Impetus of Refrigerator Drive

WITH more makes of refrigerators represented and altogether a more effective campaign in every respect, although carried on with a smaller budget, the Electric Appliance Society of Northern California will hold its second annual electric refrigerator campaign in the month of May. Wholesale distributors of practically all makes of refrigerators sold in the region are contributing their financial and promotional support to the program. The makes represented will be Apex, Atwater-Kent, Crosley, Cyclops, Frigidaire, General Electric, Gibson, Grunow, Hotpoint, Kelvinator, Leonard, Norge, Stewart-Warner, Westinghouse.

Central display feature will be an easel backed, six-color poster, which will be given free to all dealers, around which to make both floor and window displays. A very effective slogan for the campaign is as follows: "It Costs You Nothing—It Pays for Itself."

Advertising will center around 48-in. newspaper advertisements in approximately 80 papers in the Northern California region. Clip sheets for publicity material and pictures will be supplied to all these newspapers for local tie-in advertising and special pages.

Hostess programs are to be arranged in 41 PG&E offices along a similar plan which was carried on last year. This will represent more offices than were engaged in hostess schools last year. These hostess schools will be carried on from three to twenty-two days, depending upon the size of the offices and the territory served. A cooperative display will be featured in which local dealers will have on display in the power company office one of their models. These models will be all connected for actual demonstration and each one will be filled with some frozen dessert or a sample of refrigeration which the hostess can use to demonstrate the virtues of electric refrigeration. It is estimated that the traffic in all of the Pacific Gas and Electric Co. offices during the period of the displays will be over 250,000.

Cooperative displays will be exhibited even where no hostess programs are contemplated. The displays will be limited to makes handled by the contributors in the campaign and to boxes of from 6 to 8 cu. ft. capacity. These displays will be maintained until June 15 in a total of 63 offices.

Visitors to the displays will receive a booklet entitled "Things Every Woman Wants to Know About Electric Refrigerators." This is being prepared by Jean Frickleton, secretary of the Society, and will contain recipes, advice on the care and operation of the refrigerators, suggested arrangement of foodstuffs to get the best results, and will be backed by a reproduction of the newspaper advertisement which will run in the local papers during the campaign.

Also, the two educational directors of the Society, Miss Byrne and Miss Hixson, will be exceedingly active, visiting all dealer establishments in the entire territory, helping with displays and advertising, arranging for shows and demonstrations and generally assisting in the promotion.

Distributors and dealers are looking forward to an exceptional season in the sale of electric refrigerators this year. All dealers are being urged to capitalize on every promotional effort being made in their vicinity in order to bring as many of these sales to their own stores as possible.

Edison Offers Dealer Salesmen Trip to San Diego Fair

RIDING close in wake of its sensational electric range offer through cooperative dealers, the Southern California Edison Co., Ltd., launched with refrigeration distributors and dealers in its territory its 1935 refrigeration campaign.

The most significant feature of the big campaign as announced by W. L. Frost, vice-president in charge of sales, and H. C. Rice, manager of the merchandising department, is a plan to offer dealer salesmen who make a quota of 30 sales of domestic units a trip to the San Diego Exposition with all expenses paid, plus cash prizes for those who exceed quotas by substantial margins.

Called the Four-Point Refrigeration Campaign, the drive lasts from April 1st to June 22nd, a period of 12 weeks. Point One is that of extensive advertising. The Edison company will blanket the territory in 170 newspapers. Dealers are invited to tell their product story on the same page with the Edison ad. These will appear in weekly as well as daily papers and every ad will bear the name and address of the local electric refrigeration dealers.

Two-hundred sixty-five 24-sheet billboards featuring refrigeration exclusively will be used. The Electrical Times, the magazine to customers of the Edison company, circulating to 620,000 people, will carry a story on the campaign from the consumers' angle. Employee prospects and prospects from users will be rewarded, all sales being made by dealers.

Nine hundred one-minute transscriptions with sound effects over six local radio stations in the territory of the company will feature the refrigeration idea. Mary Holmes in her Electric Home Institute broadcast over Station KNX will also stress electric refrigeration during the period. Window posters, bill stickers, counter cards will also be provided. A small owl with the admonition "Be Wise, Be Modern, and Keep in Step with Boulder Dam" will feature all the advertising used.

The second point is that of financing. Believing that customers in the lower income brackets can be reached with longer terms, the Edison company is extending its low financing terms from two to three years to dealers of makes of refrigerators cooperating with it. Fees charged the dealer are 1 per cent of cash, balance on a 12-months' contract; 2 per cent on 13 to 24 months' contract; and 3 per cent on 25 to 36 months' contract. Certain qualifications, such as having a sales room, adequate display, a sales force, a service department and a willingness to make monthly reports are required of the merchant. Details of this can be obtained from the merchandising department of the company. Refrigerators must be for domestic use only. Second-hand refrigerators will be included in the offer.

The little owl symbol used in all the advertising during this campaign.

The third point is the special feature of the campaign, namely, that of offering salesmen who make a quota of 30 sales or units a trip to the San Diego Exposition. Domestic refrigerators will qualify as one point and apartment house or quantity sales will be credited according to a definite scale. Salesmen exceeding their quota by the greatest number of points will be eligible to cash prizes as high as $200. The regular scale of these prizes is also available from the company. A total of 33 cash prizes, totalling $2,395, are offered dealer salesmen in this contest.

The fourth point of the plan is that each Monday night beginning April 1st at each division point of the company all refrigeration salesmen are called upon to attend a special sales meeting. These meetings will be conducted by an Edison field representative and will be featured by radio messages from the main office broadcast to each of the meetings. The objective of this series of twelve meetings will be to instruct salesmen in the fundamentals of salesmanship of electric refrigeration, its advantages and superior points over competitive types. Instructions will also be given on rates and their application. In general these sales meetings will be conducted along lines found successful in all strong selling organizations.

Weekly reports both on salesmen and on purchasers will be a regular part of the campaign in order to credit dealers and salesmen with the proper sales record. An increase of sales of 20 per cent over last year is expected from this sensational sales program.

Window displays for better lighting featured the strong human appeal of a baby's "brand new eyes."

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Pacific Power Exceeds Washer-Ironer Quota

WASHING machines and ironers found exceptional sales acceptance in the territory of Pacific Power & Light Co. during the month of March when that company conducted a washer and ironer campaign. Other major appliances, such as ranges, water heaters, refrigerators, vacuum cleaners and pumps, were also featured, but particular effort was placed on the washing machine and ironer feature. Quotas were assigned to various districts and the agents and salesmen in the campaign closed with an achievement of 186 per cent of system quota.

Pasco-Kennewick district won the first place in the washer and iron campaign, scoring 377 per cent of quota. Deschutes district, with 353.8 per cent of quota, placed second and Sunnyside came in third with 230.5 per cent of quota. Total sales for the 30-day period reached 144 washers, 54 ironers, 131 ranges, 36 water heaters, 49 refrigerators, 16 vacuum cleaners and 9 pumps.

Bill Fitzstephens, of Pasco, was the salesman with the highest number of points. R. L. Gales, of Deschutes, was second.

A quota of 300 electric ranges and 240 water heaters was assigned to all districts for the three months' home modernization campaign which started April 1. A special salesmen's campaign stunt was the organization of what was known as the "Raspberry Club" with a special pin which each salesman wore until he had sold one range or one water heater. The club trophy, a grave tombstone, remained in the district manager's office whose district had the least percentage of sales. Naturally, great effort is being put forth to shift the tombstone out of each division.

Flatirons are also being featured during April, with a quota of 240 appliances.

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• "NORTHWESTERN NEIGHBORS" is the name of a new radio program sponsored by the Northwestern Electric Co., of Portland, Ore., and broadcast over station KOIN, of Portland, each Tuesday night at 9 o'clock. The neighborly idea is carried out in the program by having local celebrities featured on the various programs.

Dealer Leases Power Company Floor in Santa Cruz

WHAT both parties frankly regard as an experiment, although it has been in fairly successful operation for more than a year, is a plan wherein the power company has leased the floor space at its main office to a local dealer, somewhat in the manner that department stores do the same thing in the handling of various departments in a store. This plan is being tried out in Santa Cruz, where the Coast Counties Gas & Electric Co. and the Star Electric Co. of Santa Cruz, are the parties to this unique arrangement.

The plan resulted from a suggestion made by the Star Electric Company when it became known to the dealers that Coast Counties contemplated withdrawal from the direct selling of electric refrigerators, washing machines and ironers. The Company desired to maintain for their customers benefit a live floor display with competent sales help in attendance, but felt that dealers needed the merchandising profit from major appliance sales to support an active sales force.

According to John Holt of the Star Electric, and H. W. Edmund, sales manager of the Coast Counties, the plan has worked reasonably successfully during the past year and will be continued this year.

When the arrangement first went into effect the Star Electric Co. inventoried the stock maintained by the power company in its office and this was taken over to be sold by Star Electric. A percentage on sales made, either from the floor or from leads developed on the floor of the power company office, was paid to the utility as rental and for the use of the facilities. The utility still maintained its own merchandising department on gas appliances. Any leads for gas appliance sales obtained on the floor by the Star Electric were turned over to the gas department. The Star Electric Co. still maintains its own store a block or so away on the other side of the same street in Santa Cruz. From its main store its contracting business is conducted and appliance sales are also made.

Since the first of February Frank Carroll of Star Electric Co. has been on leave from that firm, retained by the utility to conduct a survey of all of its rural domestic consumers. He is making a contact, to explain the new D S rate, to make a check of the appliance used and to develop any business electrically that can be developed for the benefit of the utility.

The new D S rate qualifies a customer who has installed a range or water heater. The rate applies to single family dwellings and is as follows: No service charge; first 80 kw. hr. 5 cents, next 120 kw. hr. 3 cents, next 300 kw. hr. 1½ cents, all in excess 1 cent, with a $4.00 minimum per month. Load limiting devices or double throw switch is the net required to obtain this rate.

Miss Evelyn Kelley, home lighting service demonstrator who has just been engaged by Coast Counties Gas & Electric Co., Santa Cruz, to carry on home demonstration for improvement of domestic lighting

In this work Mr. Carroll has been able to uncover prospects for soil heating, dairy electrification, has developed line extension prospects and leads for many appliances. Because of his training as an electrical contractor he has been able to give technical information and develop leads along lines which an ordinary appliance salesman could not do.

Mr. Holt feels that other dealers and contractors in the vicinity have also benefited by this arrangement. When wiring is to be done, if a customer expresses preference for any other wiring contractor, she is urged to give the business to that contractor. Also where a specific make of appliance that is not handled by the Star but by another dealer is desired, such leads are sent over to the other dealer for closing. In the ordinary run of power company merchandising the salesman is so intense upon his own merchandising that consideration is seldom given to competing dealers in this fashion.

Of the operation so far Mr. Holt feels that while floor sales have not been sufficient to justify the overhead of maintaining the floor display, nevertheless the promotional and advertising value of electric merchandise shown and demonstrated to the hundreds who come to the office daily have made the plan worth while to all the local dealers.

On the utility's part Mr. Edmund feels that the plan has been reasonably successful and will continue on this basis. Asked whether it would be extended to other offices of the company, he said that there was small likelihood of it. It is still in the nature of an experiment and has not yet been made a matter of permanent company policy. In other regions, however, he pointed out, it is the policy of the company not to sell the profitable items such as refrigerators, washing machines and vacuum cleaners in competition with dealers unless these appliances are not sold in any particular locality. Attention is concentrated in these other regions on ranges and water heaters which dealers have found harder to sell.

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Utah Dealers Close Washer-Ironer Drive

DEALERS in the Utah Power & Light Co. territory closed a washer and ironer campaign in March with remarkable results. Total washer sales in March reached the number of 1,014, representing a dollar volume business of $60,840. Thirty-seven electric ironers were sold in the period, representing a dollar volume of $2,590.

All dealers who participated in the campaign reported fine results from their efforts. The campaign showed an increase of almost 100 per cent over average sales. Averages sales over the past eleven months have been 549 washers per month.

The company advocated that dealers offer a combination purchase plan to washing machine customers. It was pointed out that about 264 hours a year are spent with a hand iron or an equivalent of 33 working days and that more than 50 per cent of this time could be saved with a modern ironer. It was also pointed out that customers could be told that a child could do 80 per cent of the family ironing on an ironing machine and that after anyone became acquainted with the operation of the machine they could do practically 100 per cent of the ironing.

Electric irons are being featured during the month of May. Both the company and dealers are featuring specials on electric irons during that month with a trade-in offer for old irons.

Dealers Sales Double Utilities' in Portland Range Drive

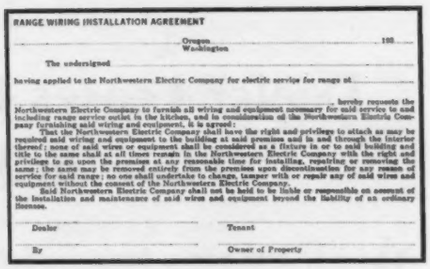
FREE wiring of electric ranges was instituted for a nine week trial period in Portland, Ore. and surrounding territory by Portland General Electric Co. and Northwestern Electric Co., beginning March 18. The decision to try out the free wiring inducement was reached after careful investigation and study of all the facts and possibilities by the two utility companies. With an over-all range saturation of 25 to 30 per cent, chiefly among those customers in the higher income brackets, the companies felt that a real inducement of a spectacular character would be necessary to put electric ranges onto the lines in volume this year. Free wiring was decided upon rather than special long terms to finance purchases, such as is being tried in some other localities in the Northwest. Cooperation in the campaign was sought from all the electric range interests in the city including retailers, wholesalers and manufacturers, and the response was immediate and enthusiastic.

Other features of the campaign are sales contests for the salesmen of dealers outside the utility companies, and a window dressing contest for dealers. These contests were designed to draw into the campaign as many outlets as possible and to arouse the interest of salesmen in furniture and department stores that have other lines to sell, including directly competitive equipment such as gas and hard fuel ranges. The result is that there are 25 dealers actively engaged in pushing electric range sales in Portland, and these dealers, representing practically 100 per cent of the retail range outlets in the city, employ approximately 65 range salesmen, who, however, are not necessarily employed exclusively on range sales.

Up to April 10, the middle of the fourth week of the campaign, 476 ranges of all makes handled in the city have been sold against a quota of 1,200 ranges for the 9-week campaign period. Dealers' sales to date have been two to three times the sales by the utilities. About 75 per cent of the sales made have required wiring; the balance are going into homes already wired. In addition the free wiring offer has brought into use a number of ranges previously purchased but temporarily out of service because of the expense of wiring them into unwired rented houses to which the owners had moved since acquiring the range and installing it in its original location.

In every case requiring free wiring the company serving the premise takes a signed agreement from the owner and, if the premise is rented, also from the tenant, describing the extent of the wiring to be installed, and stipulating that the company retains title to the material. The agreements required by both companies are identical. (sample attached) The type and arrangement of the wiring installed, which, incidentally, involves sequence metering and the reconnection of the balance of the house wiring to the new service entrance and the new meter, is shown on the attached sketch. All of this work is let out in rotation to regularly licensed contractors in the city at a flat amount of $23 per job, which has been found to meet conditions so that the contractor can make his normal profit on any number of jobs. Under this arrangement the contractor furnishes all material except the entrance switch box and fuses provided by the company. This wiring is represented to the public to be merely an extension of the heavy service wires from the point where they attach to the house on into range, the point of heaviest use. One company is capitalizing the cost of this wiring. The other is charging it off as a range selling cost.

The contest for dealers' salesmen to run continuously during the 9-week campaign is set up to permit one draw for every range of a participating make sold by every salesman and connected to the utility companies' lines. This draw is good for from 25c to $10.00, there being $140.00 total in varying amounts in every 100 draws. At the end of the campaign three grand prizes of $100.00, $50.00, and $25.00 will be given to the salesman selling the most ranges, the second greatest number and the third greatest number respectively. Funds for this feature of the campaign are contributed by the range manufacturers, or their distributors, in direct proportion to the number of ranges of each that are sold and drawn for during the campaign. Salesmen of the utility companies are not eligible for this contest.



RANGE WIRING INSTALLATION AGREEMENT

Oregon
Washington

..... 193....

The undersigned .....

having applied to the Northwestern Electric Company for electric service for range at .....

hereby requests the Northwestern Electric Company to furnish all wiring and equipment necessary for said service to and including range service outlet in the kitchen, and in consideration of the Northwestern Electric Company furnishing said wiring and equipment, it is agreed:

That the Northwestern Electric Company shall have the right and privilege to attach as may be required said wiring and equipment to the building at said premises and in and through the interior thereof; none of said wires or equipment shall be considered as a fixture in or to said building and title to the same shall at all times remain in the Northwestern Electric Company with the right and privilege to go upon the premises at any reasonable time for installing, repairing or removing the same; the same may be removed entirely from the premises upon discontinuation for any reason of service for said range; no one shall undertake to change, tamper with or repair any of said wires and equipment without the consent of the Northwestern Electric Company.

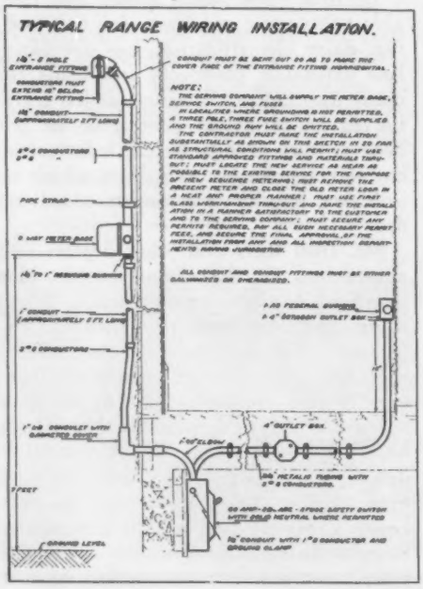
Said Northwestern Electric Company shall not be held to be liable or responsible on account of the installation and maintenance of said wires and equipment beyond the liability of an ordinary licensee.

Donor ..... Tenant .....

By ..... Owner of Property .....

Range wiring agreement signed by the tenant and owner. On the reverse side a record is kept of installations and removals

Range wiring requirements are set forth on a blue print which gives all pertinent information



Dealers Window Contest

The window display contest set up prizes of $25.00, $10.00, and $5.00 for the dealer having the best, second best, third best range windows during the five day period April 5 to 10. All dealers were urged to enter this contest at this time to get the mass effect that comes from a multitude of simultaneous window displays. First prize was won by Powers Furniture Co., second by Jennings Furniture Co., and third by Sears-Roebuck. A separate window display contest for dealers in the smaller towns outside of Portland, served by the two companies, will be set up for a later period in the campaign. It was felt that it would not be fair to ask these smaller town dealers to compete with the large department and furniture stores in the city, many of whom retain window trimming experts.

Both utility companies allocated substantial sums for general advertising to bring out the free wiring offer and the general sales features of electric cookery. In the large newspaper spreads announcing the campaign and in the follow up advertising running throughout the campaign period thereafter, no

makes of ranges are mentioned. Each dealer, however, was urged to tie in with his own advertising of the make or makes he was selling and much of this tie-in advertising was done. Truck banners, store cards, and window trimming material, were also furnished by the utility companies to all dealers who would use it. Bill board advertising of a general character and radio announcements were also features of the utilities' end of the promotion of the campaign.

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Dealers and Company Join in Spokane Range Campaign

LIMITING its offer for free wiring to a short time only, The Washington Water Power Co. in cooperation with the dealers of Spokane, has launched a spring range campaign in the central Washington region. Advertising the fact that this will be the only time free wiring will be available during 1935, dealers and the utility are making a drive for range business during this present campaign.

In a newspaper statement each of the range dealers makes an announcement of the makes he carried and of the special offering to the public.

Washington Water Power Co. was quoted by Ross B. McElroy, merchandising sales manager, as featuring Westinghouse and Hotpoint ranges. The Crescent store, according to announcement by Andrew A. Salmon, department manager, features the General Electric range. J. F. Boothe, office manager of the Brown-Johnston Co., announced the featuring of L & H ranges and told that for the first quarter of 1935 sales have exceeded those for the total of 1934. George Castle, manager of the Palace Department Store, featuring L & H and General Electric ranges; R. C. Ehrenberg, store manager of Kemp & Hebert, featuring General Electric ranges; L. Keith Vallandingham, department manager of Tull & Gibbs, handling Monarch ranges; Gordon Orput, sales manager of Smyth Plumbing and Heating Co., featuring the General Electric ranges; and K. A. McCreight, of Maxwell & Franks, featuring General Electric and Graybar-Crawford ranges, all pointed out in their statements the advantages of electric cooking and automatic control as well as the attractiveness of the electric range in the modern kitchen.

Late reports of the progress of this campaign showed an unusual acceptance by the public of the Spokane territory of the special offer. More than 100 homes in the region had adopted electric cookery, according to Ralph C. McElroy, merchandise manager, Washington Water Power Co. The free wiring offer was given credit for the overwhelming response to the range campaign. Wiring crews of contractors have been unable to keep pace with orders, according to the reports, and shipments of new model ranges to dealers have been speeded up to take care of the demand. It was also announced that May 4 has been set as the closing date for the special campaign.

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• FRESNO started toward its annual refrigeration showing when Dr. G. W. Allison, of the Edison Electric Institute and field representative of the National Electrical Refrigeration Bureau, served as the opening speaker. Fresno planned its spring opening show on refrigerators and electrical appliances tentatively for May 2 and 3. Dr. Allison spoke to a large meeting of refrigerator dealers and distributors in Fresno.

DEALER SALES REPORTS—FEBRUARY-MARCH 1935

A Summary of the Dealer Reports Compiled by Associations, Societies or Bureaus, or Dealer Contact Departments of Utilities

APPLIANCE	P. G. & E. Co.[1]		San Diego Cons. G. & E. Co.[2]		San Joaquin Lt. & P. Corp.[3]		So. Calif. Edison Co., Ltd.[4]		Utah Power & Lt. Co.[5]		Wash. Water Power Co.[6]	
	*Feb. 1935	Year to date	*Feb. 1935	Year to date	Mar. 1935	Year to date	Mar. 1935	Year to date	Mar. 1935	Year to date	Mar. 1935	Year to date
Ranges	117	285	13	16	128	370	482	1,150	183	398	31	61
Water Heaters	43	93	.....	2	70	178	303	757	22	33	10	50
Air Heaters—aux.	360	1,745	130	324	20	48	120	444	5	92	89	160
Air Heaters, 220 volt	.....	.....	.....	.....	79	233	.....	.....	.....	.....	.....	.....
Refrigerators	1,497	4,173	128	238	497	870	1,740	3,670	455	863	397	677
Dishwashers	1	11	.....	.....	1	1	.....	.....	.....	1	.....	.....
Washers	1,914	6,192	200	407	327	825	2,275	5,979	1,014	2,136	344	835
Ironers	572	1,907	35	83	51	135	312	854	37	88	27	85
Vac. Cleaners	1,465	5,170	127	234	96	245	783	2,045	444	1,323	118	513
Radios	5,024	18,716	800	1,610	479	1,399	3,914	11,517	611	2,527	627	2,009
Mixers	295	723	48	95	53	150	220	768	147	656	75	246
Cookers & Caseroles	.....	.....	14	26	18	46	28	81	7	16	212	490
Irons	.....	.....	204	372	266	880	1,125	3,280	564	1,901	434	1,040
Waffle Irons	.....	.....	133	279	88	336	315	1,068	119	559	95	403
Toasters	.....	169	358	.....	102	359	478	1,435	245	968	342	1,068
Table Stoves, Grills, etc.	.....	.....	31	64	106	323	207	646	429	1,369	.....	.....
Heating Pads	.....	.....	94	183	.....	.....	185	720	80	464	81	241
Curling Irons	.....	.....	.....	.....	.....	.....	61	192	100	503	.....	.....
Perculators & Coffee Makers	.....	.....	124	145	76	274	312	897	77	345	239	760
Sewing Machines	943	3,311	16	30	.....	.....	.....	.....	.....	.....	91	171
Clocks	.....	.....	.....	.....	92	282	392	1,102	158	500	316	681
Fans	.....	.....	.....	.....	.....	.....	12	40	3	16	9	23
Floor Polishers	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sun Lamps	.....	.....	.....	.....	5	14	28	86	6	30	4	16
Portable Lamps, Reflectors	.....	.....	.....	.....	73	253	.....	.....	794	.....	235	821
Misc. Lamps, Pin-up, etc.	.....	.....	.....	.....	.....	.....	.....	.....	857	.....	1,615	3,337
Yard Lights	.....	.....	.....	.....	41	113	.....	.....	.....	.....	.....	.....
Misc. Small Appl.	.....	.....	244	459	160	403	473	1,153	13	66	.....	.....
Total Dealers	.....	1,400	.....	100	.....	.....	573	573	.....	.....	.....	.....
No. Reporting	.....	.....	.....	.....	115	107†	539	504†	238	243†	.....	.....

* March Report was not available at time of going to press. † Arithmetical average number of dealers reporting since first of the year.
[1] P. G. and E. reports obtained only on major appliances upon which accurate reports are available from dealers' accounts. Total dealers include gas as well as electric dealers. First report of year 1935 starts with Dec., 1934 and will be cumulative from that month.
[2] Gathered by Bureau of Radio and Electric Appliances of San Diego County. Clocks, fans included under miscellaneous.
[3] Includes dealer reports from Midland Counties Public Service Corp. territory also. Compiled by Valley Electrical Supply Co.
[4] Includes reports from dealers on San Joaquin Valley system of the company as well as Southern California areas served. Comparative figures of same month last year indicates improvement.
[5] Includes Utah Power & Light Co. territory in Utah, Idaho and Wyoming. Also Western Colorado Power Co. territory.
[6] Dealer sales only for Spokane and company's territory. Company sales not included. Table stoves, grills included with cookers.

Codes in Operation + + +

[Practical and significant suggestions from the code authority chairmen of this territory telling how to make code operation effective]

Los Angeles Association Sets Up Simple Program of Operation

SIMPLICITY is the essence of the mode of operation adopted by the Los Angeles branch of the Southern California Chapter, National Electrical Contractors Assn., since its reorganization shortly after the N.R.A. code became effective for the electrical contracting industry. The association, naturally, was the outgrowth of previous associations dating back to old Southern California Electragists days. In its reorganization the first step taken was affiliation with N.E.C.A. Much of its early activity was concentrated in perfection of the local administrative committee set-up for the operation of the contractors' code in Los Angeles and neighboring cities.

The code work now having been organized and put into smooth operation, attention has been directed to other association activities, the most notable of which has been the publication of a manual of labor units for electrical estimators which was described in these columns in the last issue.

Recently, also, a new constitution was adopted at the time of the election of its officers. This constitution is a model of brevity and yet embodies the principles necessary for successful operation of the association. It briefly sets forth the name, extent and purpose, membership requirements, the territory covered, the officers, the committees, the bylaws, quorum, the dues, the resignation, and national constitution provisions necessary and a means for amendments of constitution or bylaws as required. Lastly, it incorporates by reference the requirements of the National Electrical Contractors Assn. or of the Southern California Chapter.

Officers of the organization are A. L. Stone, Stone Electric Supply Co., Los Angeles, president; George deAth, Peerless Electric Co., Los Angeles, vice-president; C. J. Nutsch, Beverly Hills, treasurer; and an executive committee consisting of the foregoing and H. L. Evans, Nicholas Electric Co., Los Angeles; Charles Taylor, Bennett & Taylor, Los Angeles; R. M. Fry, Fry Electric Co., Los Angeles and F. R. Ulbrich, of Ulhart Electric Co., Los Angeles, as members. Mr. Ulbrich was elected at its last meeting to replace C. J. Bennett, of Bennett-Forsberg Co., who had formerly been on the executive committee.

The secretaryship is carried by A. H. Gudie, of Biddle Trade Bureau, Los Angeles, who has been responsible for much of the effective guidance of the organization.

At the March 26 meeting Mr. Evans made an interesting report in which he checked up the bidding figures of his own firm and competing firms on 58 jobs on which the company had been in competition with other firms. Sixty-four contractors bid on these 58 jobs and yet interestingly enough the number bidding on five or more of this number of jobs was only 14. Further analysis showed him that an average of $120 had been "given away" on each job by one of the many low bidders.

Educational features of this kind serve to make the meetings of value to all who attend. They are bringing about also a better code compliance. Together with the estimating class being held in conjunction with the publication of the manual of labor units, which school is being held at the Frank Wiggins Trade School, is bringing about a more intelligent bidding practice.

Response to the issuance of this labor unit manual has been surprisingly widespread. Calls for the manual in large numbers have been made from associations throughout the United States and the first edition has been completely sold out and another is in preparation.

Under the form of organization provided by its constitution each of the committees is headed by an executive committeeman who acts as its chairman. Committees are selected as needed rather than by any set formula. For instance, there is the labor committee headed by George deAth. President Stone heads an industry relations committee. R. M. Fry is the chairman of the educational committee. Herbert Evans is chairman of a membership and attendance committee. Treasurer C. J. Nutsch heads the finance committee. Bylaws are considered and handled by a committee headed by Charles Taylor, while the City Hall matters and legislative contacts are made by the committee headed by Mr. Ulbrich.

Preliminary plans were discussed for working out a quantity survey system, but as yet details of this have not been developed in a final form.

Membership aims, according to Mr. Gudie, are for a really cooperative group rather than mere volume of membership. While membership totals about 60, it has been found by examination of building records that these members do about 80 per cent of the electrical construction business in Los Angeles, whereas the non-members, totaling over 200, do but 20 per cent of the volume.

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Contractors Discuss Code Administration

Discussions centered almost completely around financial problems of code administration in the recent meeting of the Code Authority for the electrical contracting division of the construction industry in Chicago, according to Lloyd Flatland, chairman of the 12th Region, San Francisco, who was in attendance.

While no changes were made in the method of assessment, this problem was discussed at length.

A minimum overhead percentage was not approved by NRA nor was the use of the Electragists' system of estimating which it was proposed be used as a "yardstick" for checking the cost provision for code administration.

After considerable discussion of central bid depository systems a resolution was passed denying approval to the instructions and rules for joint facilities as set up by the construction division code at the present time. It was recommended, however, that where joint depositories exist that the electrical division would approve such depositories where the method of operation seemed to be sound and in the general interest of the industry.

It was also brought out that mutual agreement between the divisional code authorities has been fine, which will lead to the clearing up of overlapping jurisdictions of the codes as at present found. Proper allocation of assessments and similar matters is subject to N.I.R.B. approval. Some divisions have already approved these allocations of assessment funds.

Valley Association To Conduct Estimating Class

FEELING that proper estimating is the very basis of a profitable contracting business, George L. Black, manager of the Valley Electrical Contractors Assn., has announced the formation of a series of night classes in estimating among the contractors in the Orange Belt Region. This association covers the San Bernardino and Riverside Counties and classes will be held in various cities in that area. Local problems will be given analysis and the size of the classes will be small enough in this way to prevent them becoming unwieldy.

In an announcement of this educational work, Mr. Black says "It is not the object of your association to impose upon you their 'pet' methods of estimating, but to teach basic principles upon which the individual may build his own system. At these meetings the proper use of the uniform estimate sheet, the proper use of the labor manual, the proper procedure in taking off a job, and the proper method of laying out a job will all be covered. There will be no charge in connection with this school, and it will be open to nonmembers as well as members." Details of the plan were given at a meeting at the American Legion Hall, Redlands, April 18.

The labor manual referred to is that of labor units prepared by the Los Angeles branch of the Southern California Chapter, NECA."

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• ELECTRICAL WHOLESALE trade code of fair competition has had approval of NIRB of an amendment making it an unfair trade practice for members of the trade to "offer to grant" or "offer to allow" discounts now prohibited by Section 8 of Article IV of the code. The previous article merely made the actual granting or allowing of discounts unfair trade practice, but it was found that offerings of such discounts were being made which proved detrimental to competitive practice.

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• JOHN R. MCSWEENEY, Chicago attorney, was appointed by NRA as impartial chairman of a board to investigate complaints of unfair competition in connection with collective bargaining agreements between employees and employers in the electrical contracting division of the construction industry.

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• RADIO WHOLESALING trade code expenditures have been approved by the NRA, including expenditures prior to Feb., 1935, in the amount of $8,000 have been authorized.

• NEW MEXICO at a special session of legislature, Feb. 23, 1935, enacted a new State Recovery Act, repealing the former act of the legislature of 1934. Under the new act all national codes of fair competition are effective as the standards of fair competition on intrastate transactions, and violations of the codes are made misdemeanors and upon conviction an offender is subject to a fine of $500 or imprisonment for each offense, and each day the violation continues is deemed a separate offense. The act is in force for two years from the date of its approval.

Change

"Every agency of human progress from the wheelbarrow to the airplane and from a tribal council to a republican form of government has been opposed and scoffed at by the tired old men and the young-men-in-a-hurry of every generation. The tired old men are sure you can't remake human nature. The young-men-in-a-hurry think you can reform human activities by setting up new systems overnight. But the fact is that aggressive, mature, men and women of imagination, by steadily improving human mechanisms of cooperation, steadily advance the level of civilization. . . . . The progress made in two years in building a better, safer, fairer industrial structure has been enormous. The man who would give up the effort and smash the machine is the same type of man who one hundred years ago wanted to prohibit railroads, and thirty years ago was denouncing automobiles, as dangerous and destructive experiments to the 'natural order of human existence'."

DONALD R. RICHBERG,
Acting Chairman,
National Industrial Recovery Board.

• ELECTRICAL CONTRACTING Division of the Construction Industry submitted to the National Industry Recovery Board for approval a budget for code administration expenses from April 30, 1935, to April 30, 1936. The proposed basis of contribution is 1 per cent assessment on productive payrolls of members of the industry, to be reported and payable monthly for support of the National Code Authority and the Regional and District Agencies. For Local Administrative Committees, one-fourth of 1 per cent of all contracts or work or services performed by members of the industry within the respective areas of local administrative committees, is authorized, such contracts or work or services to be registered with the assessment paid to the respective committee. Application for termination of the exemption granted members of the industry whose principal line of business is embraced by the provisions of another code were also made to NIRB. Meeting on this subject was held in Washington, April 24.

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How Consumer Fear Was Answered

EVERY local administrative committee has its troubles. Not only do these include troubles between competitors among electrical contractors but often the public comes to it with protests of what it thinks are high prices.

Charles Shipman, veteran in the industry and member of the local administrative committee in San Francisco, had such an experience recently which illustrates how best it can be treated in other cases of a similar kind.

A retail merchant came to the local administrative committee complaining that he understood there was a 50 per cent mark-up of profit on a job which he wanted done and on which he had received three bids. Mr. Shipman asked the man what kind of business he was in and found that he was a retail merchant and a member of the Retail Merchants Assn. He then asked him if it was not true that a retail merchant as a general rule found it necessary to mark up his merchandise at least 100 per cent from cost to arrive at his selling price. This the merchant agreed was correct. Mr. Shipman then pointed out that the contractors only mark up 50 per cent of costs and then proceeded to point out some of the hazards of electrical construction which must be covered in this mark-up.

He asked first, "who would be responsible if one of the men working on the job, as an electrician, made a mistake? Would you be willing to be responsible?"

"No," the man replied, "I have a contract." Mr. Shipman then pointed out that the contractor would be responsible. He also pointed out that if the inspector found any error in the installation the contractor would also have to be responsible for correcting this. He then pointed out that the contractor also has overhead expenses, such as rent, telephone, transportation, etc., which all must come out of this mark-up. Finally, the merchant, completely satisfied, left with the declaration that he guessed he was a piker to complain over the matter.

The point of this experience, says Mr. Shipman, is that by bringing the problem home to the complaining customer in his own type of business he can see the point and the objection in most cases will be removed.

EDITORIAL + + +

From the Firing Line

AN industry clinic has just been completed by the Pacific Coast Electrical Association. Eight problems, fundamental and profound, were defined last fall. During the past month 726 people representing the rank and file, the troops on the firing line, gave their answers. This showing of interest alone was inspiring, exceeding the most optimistic expectations. But even more inspiring were the ideas and thoughts of these workers, their convictions, their intimate knowledge of the basic problems of the industry, their appreciation and understanding of the vexatious and intricate questions.

With viewpoints as refreshing as they were constructive and with a startling degree of frankness and sincerity, salesmen, clerks, engineers, operators, testmen, manufacturers' employees, load dispatchers, wholesalers, superintendents, accountants, in fact, people from every section of the industry had their say. Prize money was offered, but this was not the inducement that brought forth the responses; it was the desire to express ideas coupled with the prestige that would come with winning.

Here, briefly, are the significant viewpoints:

Increasing Power Sales

Return of power load to the peaks of 1929-30 in this area would tax existing facilities and would spell prosperity for the entire industry. How might this be accomplished? Solution of this problem will be speeded by long-range sales planning coupled with detailed market analysis.

Commercial departments might consider such ideas as the employment of a traveling sales agent whose sole duty would be to contact prospective Eastern industrials which might locate on the Pacific Coast. Another meritorious contribution dealt with long-term financing of industrial electrical apparatus and wiring. Rate simplification warrants attention according to the men on the firing line.

Building Domestic Load

COMMERCIAL managers should be heartened by the interest shown in this problem, which brought forth the second highest number of answers. Every phase of the problem known to the industry was reviewed and some original suggestions developed. Recommendations for bringing to the American home the "more abundant life" made possible by electrical conveniences, and at the same time increasing load and profits for every branch of the industry, ranged from suggested all-industry cooperative selling drives to methods for improving domestic load factor and reducing average rates by the perfection of a system of off-peak storage heating.

Cooperation with those administering the National Housing Act, particularly financial institutions, as a means of extending the benefits of that measure was emphasized. Schooling of architects and building contractors in home electrification, reduction of appliance prices and wiring costs through volume selling, and rate simplification were other solutions offered. Better salesmanship, more thorough sales training and finally widespread use of its own products by every member of the industry would help build the domestic market.

Stimulating Cooperation

EVIDENTLY cooperation is too complex and too misunderstood to generate suggestions from the rank and file of the industry. Or else too many people in the industry are so definitely placed in their own particular groove to be aware of its desirability and its possibilities. These explanations must suffice for the lack of response to this problem.

However, the winning papers proved conclusively that great benefit will accrue to the industry from any extension of cooperative effort. Some of the proposals are radical in the light of tradition and experience. Yet, so too are many of the paths that business and industry are following today. For the good of the industry as a whole, the recommendations of the authors of these papers warrant careful study, and possible trial.

Winning Public Goodwill

OF the eight problems submitted, why did the one dealing with public goodwill attract almost half the total number of answers? Men and women on the firing line realize that the industry is "on the spot." And they are as concerned as their bosses about the reasons and the remedies. Management may look for a long time before discovering greater proof of loyalty of the rank and file.

Suggestions for improving customer goodwill ran into the hundreds. Greatest emphasis was placed on courtesy, character and employee training. Methods of correcting the popular misconception as to the cost of electricity were explained. "Bring public relations out of the office and put it on the counter" was the plea of the winning paper.

A new volume would be added to the literature of business if all of the papers on this subject could be printed. And it should be required reading for ev-

ery person in the utility business who contacts the public in any capacity, whether he be president or telephone operator.

Loading Existing Facilities

WINNING papers on this subject conclusively bear out the need for close cooperation between the sales and operating departments in planning load-building campaigns. As pointed out by the successful contestants, the charactersitics of certain loads which, on the surface, might appear attractive fields for new business development might prove uneconomical to serve from the operating standpoint.

While it is obvious that the electrical facilities of any system are only partially loaded during portions of the day, month, and year and equally apparent that new load added to the system which decreases the idle time now available is most economical, it must be borne in mind that the characteristics of the new load must be analyzed with reference to the present system load curve. Otherwise, costly additions to the system peak capacity may be necessitated by the addition of the new load, the additional capacity being necessary only for a few days or weeks during the year, thereby aggravating the situation.

How Much Free Service?

FREE repair and maintenance service proved to be a problem which was being given much thought, not only by the service departments but also by the members of other departments and outside organizations, if the sources of the many answers are reliable evidence. Contestants on this problem were practically unanimous, and rightly so, in their contention that the service department was a prime means of improving customer good will and public relations. However, the methods of maintaining an adequate amount of service economically for this end revealed a wide divergence of opinion.

Reducing Distribution Costs

NOWHERE among the prize winning papers was the value of obtaining a representative cross-section of the thoughts of the industry on a particular subject better exemplified than in the problem of "How Can the Costs of Electric Distribution Be Lowered?" Two of the winning solutions presented diametrically opposed opinions on this matter, yet each paper was so meritorious that the judges evidently felt that the respective presentations were worthwhile.

That such extreme divergence of opinion, as represented by these two papers, exists is a clear indication of the need for an association such as the P.C.E.A. whose function it is to bring operating and commercial departments not only of the various companies but of the same company in closer contact. To borrow an old proverb, "a problem clearly stated is a problem half solved." Mutual understanding of intra-departmental problems cannot help but breed the close cooperation essential for successful solutions.

Voltage Regulation

SUFFICIENT answers were received to prove that this subject is most important in the minds of operating engineers. The wide variety of the answers and the multiplicity of corrective measures suggested precludes discussion in these columns but one statement gleaned from a prize-winning paper sets forth the voltage regulation problem tersely.

The thought expressed was that the industry was in the habit of doing engineering work only on new construction while the real need today is engineering on the system that is already installed and, in most cases, all but forgotten. Increasing use of small domestic motors, greater load densities, and more exacting customer requirements have made the regulation problem a serious matter, both from the standpoint of good will and from the standpoint of revenue for the utility. Aside from continuous analysis of the distribution system, the papers also suggest that perhaps small inexpensive regulating devices might be developed by the manufacturer. The margin between present standards of good regulation and service which will just "get by" is pointed out to be sufficient to guarantee a market for such devices as might be sold at reasonable low cost per kva.

AS in any responsible clinic the treatment suggested for the remedy of the ailments of the industry cannot be left to any one panacea or to any single specific. Only ignorant quacks would promise so much. But for some months the industry at large has asked this challenging question: "After the answers, then what? Will all of these excellent ideas, so good as to merit reward and recommendation, be left untried? Shall not some definite use be made of them, so that the industry may derive some of the improvements which these suggestions promise?"

It would be an industry which had reached stagnation and begun to decay that would so neglect its opportunities. The wiser groups and individual companies are already closely and carefully surveying all of the suggestions and ideas offered by all of the contestants, whether they were awarded a prize or not, to determine if in these papers there are not many pertinent ideas for the improvement of their operations and their relations with the public and the industry itself. Such a procedure should be adopted.

In the winning papers that will be printed in ELECTRICAL WEST beginning in next month's Convention-in-Print number, the individual reader may likewise glean from the suggestions made many a thought for his own personal improvement and benefit. In this way all of the pay dirt will be milled finely, and every ounce of worth recovered for the good of the individual, the company, his branch of the industry, and the electrical business as a whole.

Significant Trends + + +

[*Signposts which point the road to improved business or method, brief, pertinent, useful hints as to HOW someone has blazed a new trail*]

Oregon Contractor Devises Improved Armor Tool

IT is a tough proposition to cut and shape BX cable to receive the connectors. A cumbersome tool about the size of a small pair of pipe tongs has been made for this purpose, but mostly the electrician has recourse to hack saw and pliers.

Clinton Smith, an electrical contractor of Milwaukie, Ore., has developed a tool for this purpose, hardly larger than a pair of pliers. It weighs six ounces. The jaws, whose almost flat beveled edges are ⅛ in. thick, will cut through the tough metal armor like so much cheese rind.

First one bends the cable and twists it at the same time, to throw up a loop. Next motion is to snip this loop in two with the cutting jaws. Then the crimper is used to put the overlap back in place. The crimper is a circular opening in the body of the tool, with a groove to fit the armor rib. That end is then ready for the connector.

In case of the underlap, the armor is straightened out, the end trimmed and then tucked under, using the jaws as pliers.

In much less time than it takes to read this, the cable is cut and formed ready for the connectors, a great time saver over the hack saw or other method.

First step, bending cable and twisting it so as to throw up a loop. The covering is then cut

Crimper used to form the overlap end

Trimming off and tucking under of an underlapped end

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• SPECIFICATIONS and plans for the San Francisco-Oakland Bay Bridge electrical system will soon be available to bidders, according to word from the engineering staffs of the project. It is roughly estimated that the electrical system, exclusive of the transportation system, will run to about a half million dollars. There will be a thousand sodium vapor lamps installed to light the two decks. One electrical feature will be a 35 ft. control panel located at the Oakland end of the bridge. The cable for the transportation system electrification itself will run in the neighborhood of $150,000, it is estimated.

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• VALLEY ELECTRICAL CONTRACTORS ASSN., of Riverside and San Bernardino counties, California, celebrated its first birthday with an industry dinner and entertainment, April 23, at the Chocolate Palace, San Bernardino, according to William Nance, of Redlands, president, and George L. Black, San Bernardino, field secretary of the association. The Southern California Edison Co. furnished entertainment and members of various branches of the industry took part in the affair.

...in Construction

Tell Architects to Provide Refrigerator Space

Architects, finds "Sandy" Pratt, still neglect to make a place in the kitchen for an electric refrigerator even in the houses built today. "We have lost many sales," says Mr. Pratt, proprietor of the California Refrigerator Co., San Francisco, "and I am sure that other dealers have too because of this fact."

"This presents a job for all of us in the industry," he continued, "for all of us have contacts which will eventually reach the architects and bring this important thing to their attention. Where they do provide space it is too small for an ample sized refrigerator needed by the average American family. Then more than likely there is no convenience outlet anywhere near the spot where a refrigerator could be used.

"In planning a home, architects and builders should be reminded that an outlet about 12 in. off the floor and an ample space for a refrigerator is a necessity in every modern home built today. Such a suggestion will sell more wiring, will mean the use of more electricity, will facilitate the selling of a refrigerator by the dealer and will give more lasting satisfaction to the occupant of that home."

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• ELECTRICAL CONTRACTORS ASSN. of Alameda County at its annual meeting recently re-elected all of its previous officers for another year, according to Frank Boyd, president of the organization. The association is also working on a revised policy of operation which looks forward to the strengthening of the existing organization rather than attempting to enlarge the membership to cover the entire number of contractors operating in the section.

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• MODERNIZATION opportunities in the installation of sound systems are being brought to the attention of electrical contractors very forcibly by the RCA Victor Co. through the Leo J. Meyberg Co. at the present time by a series of letters being sent to electrical contractors pointing out the opportunities for business in the installation of such systems in apartment houses, schools, department stores, churches and other similar or related types of buildings.

...in Wiring Rules

Trip Reservations for N.W. Inspectors Convention Asked

BECAUSE of the popularity of the visit to the city of Seattle's Skagit power development, especially over the Labor Day week-end, President M. P. Hotelling, of the Northwestern Section, International Association of Electrical Inspectors, has asked that all who plan to attend the 9th annual convention of that section to be held in Seattle, Dec. 3, 4 and 5, make their reservations immediately with him for the trip.

The convention itself is to be held at Hotel Olympic, Seattle. The visit to the Seattle power development will be made prior to the convention on Sunday and Labor Day, Sept. 1 and 2. Cost of the trip will be $2.50, which will include three meals, lodging, all transportation from Rockport and return, boat ride on the lake and guidance over the project. This is an exceedingly popular excursion to the people of Seattle and for this reason Mr. Hotelling urges immediate reservations for the trip.

Other entertainment features have not been arranged and the program is still in the formative period. According to F. D. Weber, secretary-treasurer, the program will likely be confined to the new legislation in the states of Oregon and Washington together with a review of the 1935 National Electrical Code. Prominent men in the industry will also give talks at the meetings.

The new president of the Northwestern Section, Mr. Hotelling, is electric plan examiner for the city of Seattle, succeeding J. F. Julian, who resigned because of loss of his position due to a political change in the city government of Wenatchee, where he was electrical inspector. Mr. Hotelling has asked that reservations be forwarded to him at 501 County-City Building, Seattle, Wash.

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• THE ELECTRICAL COMMITTEE of the National Fire Prevention Assn. meeting in New York City recently, to which representatives from both the Northwestern Section and the Southwestern Section of the International Assn. of Electrical Inspectors attended, authorized a number of changes in the National Electrical Code for its next edition. It has been announced by the National Electrical Manufacturers Assn. that Arthur L. Abbott, of the Uniform Legislation Department, and A. B. Smith, of the Codes and Standards Department, will prepare and publish a summary of the changes which have been made in the code. This will be distributed by NEMA about the same time that the revised code is issued.

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• RACKETEERING CONDEMNED—Declaring their profession and the public it serves are victims of "racketeers", the Radio Service Society of Washington, an organization of radio repair men and technicians, are urging Washington State legislators to pass House Bill No. 312, which would license radio repair and service men. E. D. Tammel, of Seattle, president of the association, points out the radio owner as well as the competent technician is frequently wronged by the incompetent or dishonest "radio expert" who offers his services as a repair man. The bill, known as the "radio technician's act", would insure that only competent men were licensed to operate as radio service men.

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• BEGINNING OPERATION under a new ordinance restricting the sale of electrical appliances to those tested and listed by Underwriters' Laboratories, San Diego dealers were sent ordinance information by the Bureau of Radio and Electrical Appliances of San Diego County. To facilitate matters a committee from the Bureau met with representatives of the city and drew up a list of old makes of radio which would be acceptable for sale, based on previous record of high standards of manufacturing policy of the makers. This was to prevent confusion as to trade-ins and sale of second-hand sets. New sets are listed as they are tested by the Underwriters' Laboratories.

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• ORDINANCES for the regulation of electric wiring installations have recently been adopted by the cities of Grass Valley and San Bruno, Calif. In both instances it was the Standard Electrical Ordinance as prepared by the Pacific Coast Electrical Bureau that was adopted, according to Frank J. Kiefer, manager of the San Francisco office of that organization.

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• CHIEF HOUSING INSPECTOR of San Diego has pointed out that there are 19,233 pieces of property in that city which do not comply with local and state maintenance specifications. A letter has been sent to the property owners pointing out that the present time is a good one for bringing these properties into compliance with the acts and ordinances in view of the fact that federal funds are available to make it easy for one to finance such improvements.

...in the Motor Shop

Motor Dealers Group Incorporates Association

Incorporating their association under the laws of California as a non-profit organization, the Electric Motor Dealers Assn. of Northern California has added an "Inc." to its name since its meeting of April 5, 1935, at the Stewart Hotel, San Francisco. Frank Boyd, president, read the new articles of incorporation which were unanimously agreed to by the members and the official functioning of the new corporation began.

Among the matters of interest discussed at the meeting was a proposed joint publication of advertising literature extolling the advantages of guaranteed reconditioned motors and electrical equipment such as are featured by the motor houses belonging.

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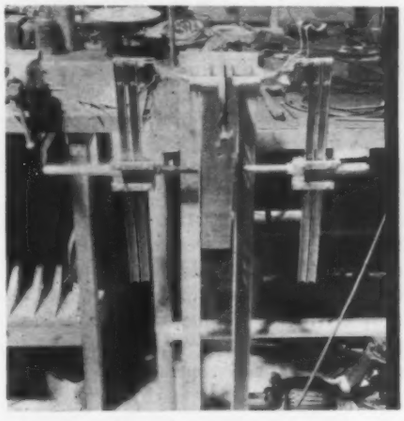

Coil Shaper

A coil shaper made from steel angle iron is used to good effect by the North Bay Electric Works, of San Rafael, for its motor repair work. J. Lamperdi says that he learned to make it when he first made a similar one for the Enterprise Electric Works in San Francisco as an apprentice some years ago.

The two ends of the wound coil are gripped by a clamp attached to an adjustable bar which is free to turn on a rod attached to the main frame. Blocks of various sizes are used to provide the bending of the coil to just the right dimensions. After such blocks are clamped in place the coil is spread by hand and in that movement is bent to the required shape.

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• "NEW WIRING IDEAS BRING OLD HOMES UP TO DATE" has been made a feature of "Electrical Times," the monthly publication of Southern California Edison Co. Ltd.

...in Merchandising

Jeweler at Taft Sells by Carload

When a jeweler sells 2½ carloads of electric refrigerators in one year that is news of the first magnitude. Yet that is exactly what the Reader Jewelry Co., of Taft, Calif., did last year with the Crosley refrigerator. What's more this achievement was made without a single salesman out in the field and without a solicitor. For a while a service man was kept on hand but he had to be let go for lack of activity in his department. As many as eight refrigerators were sold in one day by this wideawake jeweler in the hot season of last year.

So successful in the sale of these appliances were Mr. Reader and his sons that one son, Heiman Reader, was given the distributorship for 31 counties in Texas as an adjunct to the jewelry business in Taft. The Texas organization, with headquarters at Houston, is known as Reader's Wholesale Distributors and handles the Crosley refrigerators and radios in that territory.

Although Mr. Reader, Sr. handles his own term paper for most of the jewelry carried in his establishment, he finds that it is better to have the C.I.T. handle the refrigeration paper. The simple reason is that on extended payments customers are less apt to ask the large financing organization for favors in deferring payments when due than they are of a local jeweler whom they have known for years.

Center of Kitchen

Kitchen arrangement is more often a matter of habit than careful or analytical planning. An instance of departure from habit is shown in the above photograph where the usual placement of the kitchen sink with its attendant electric dishwasher is radically changed. In this rural home it was placed conveniently in the very center of the kitchen with the electric range and mixer along one side wall, kitchen cupboards along another. Since the sink is the very center of the working area of a kitchen, this logical arrangement saves steps. Note how the faucets are arranged so as to be accessible from either side. Restaurant arrangement often places the range in the center of the kitchen. However, there seem to be logical reasons for placing the sink and dishwasher in the same relative position.

Just a Thought

INABILITY to get people into his store has put more than one electrical dealer "on the rocks" in recent years. Many persons seldom enter an electrical store any more unless they have a cord or small appliance to be repaired. Fuses and Mazada lamps can now be bought at the neighborhood grocery or hardware, to say nothing of the "five-and-ten."

Some dealers seem to have solved the problem by taking space in busy hardware or department stores. These establishments, with their thousands of repeat items in stock, have a natural flow of store traffic which the isolated electric shop cannot hope to get. Even furniture stores seem to have an advantage from this standpoint.

Department, hardware, and furniture stores have sold electrical appliances for years, but many have found service and repair problems a stumbling-block. These welcome the prospect of having an experienced electrical man affiliated with their business. And many an electrical dealer would do well to consider the possibilities of reducing overhead and increasing profits by teaming up with one of these other merchants.

—P. E.

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• WASHING MACHINES are now accepted for insured loans under the National Housing Act in a special ruling of Albert L. Deane, deputy administrator of the FHA. Washers are eligible if permanently attached to the wiring system in the same manner as ranges or refrigerators.

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• MISS M. A. BEVAN, appliance specialist for Electric Bond & Share Co. properties in South America, notably Rio de Janeiro, was a recent visitor to the United States and to the Pacific Coast in particular, making studies of merchandising and demonstrating methods. While in San Francisco she personally conducted demonstrations in the offices of the Pacific Gas and Electric Co. at 447 Sutter St., in order to get the reaction of the American public to electrical appliances. A display of Proctor appliances was arranged for by Paul Priestch, Moore Electric Supply Co., and the Henry Bosch Buffetable and Kookette were used in the demonstration.

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• A HANDSOME METAL PLAQUE is being offered by the General Electric Co. to its lamp agents who do an outstanding job of Mazda lamp merchandising this fall and winter. It will be the principal award in the "Pull 'Em In" contest.

Well Arranged for Small Space

Porter's Electric Store, of Astoria, Ore., shows admirable utilization of a relatively small space. Mrs. A. Porter handles the store end, while Mr. Porter has been devoting at least half of his time outside both selling and sevicing household and industrial refrigeration. They handle the Kelvinator line. Since ordinary electrical wiring work has been light, he has had greater opportunity to develop the appliance sales end of the business. He is particularly proud of some of his recent dairy installations

Dr. Jekyll & Mr. Hyde

Ingenious is the way in which the difference between an old and a reconditioned cleaner looks is used by the Prest Electric Co. at San Bernardino. An old vacuum cleaner just as it came in for reconditioning was finished off like new on one side and the other side left as it originally came into the shop. A customer at a glance can see the contrast, and R. O. Prest has no difficulty in convincing the prospect of the need for a complete reconditioning job. The customer can see visually how his own cleaner will look, how new parts will be supplied for the old and worn parts

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• BUFORD WASHING MACHINE CO. of Fresno, active electrical merchandisers for many years, have introduced an offer whereby refrigerators are rented for the summer. Announcement was made of this offer in a recent advertisement. The company hopes to convert most of these rentals into actual sales.

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• GRUNBAUM DEPARTMENT STORE, Seattle, advertised in two full pages the opening of a cooking school and cake-baking contest similar to its exceptionally successful school last year. Mr. Mello, manager of the electrical department, claimed last year that more people attended and more cakes were entered than in any previous school in the city. The entire floor of the store is cleared for the cake show and cooking school, and it takes on all the proportions of a major event in the merchandising processes of the city.

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• USING THE CONVEYOR PRINCIPAL, together with hot oil dipping, an electric cooker which turns out simultaneously a dinner of fried chicken or steak, French fried potatoes and biscuits every 30 sec. was demonstrated by its maker, the Archer Blower & Pipe Co., of Portland, to utility representatives in that city recently. Placed on a peg of a chain conveyor either the meat or the potatoes are moved slowly through two vats of vegetable oil heated to temperatures of 375 and 450 deg. After 9 min. in the hot oil the food is cooked.

...in Lighting

Quick Ideas for the Lighting Man

• TO THE LADIES—In Liberty magazine, edited by Princess Alexandra Kropotkin, some months ago appeared a useful item. "Have you noticed how different you seem to look when you see yourself in a mirror away from home?" she asks the ladies, and goes on to say that it is a question of lighting. Half light, she says, is not good for make-up. She advocates "two strong merciless lamps, one at each side of the dressing table," and ends with this significant phrase, "Dressing tables insufficiently lighted are to blame for most of the bad make-up we see."

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• A. I. BENEDICT, lighting sales engineer of San Diego Consolidated Gas & Electric Co., has been working with the city schools of San Diego which are conducting a number of lighting and sight tests. These tests are being made in the schools of that city by the teachers themselves after receiving instructions from Mr. Benedict as to how to proceed. By this strictly impartial means the teachers are convincing themselves of the need for better lighting facilities in their classrooms.

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To Display Floodlights

Effective display of floodlights has always been a problem for the electrical dealer. A new stand provided by the S & M Lamp Co. which keeps two floodlights of different sizes on display for counter or window and provides a card which tells the story of the uses and of the cost of such floodlights has been found effective by L. A. Baker, owner of L. A. Baker Electric Co., Los Angeles. Mr. Baker attributes a substantial increase in sales of floodlights to the use of this device in both the window and on the counter. At night the window use is made with the floodlights lighted

• WEIRD, spectacular, beautiful, are the effects produced under so-called "black light," or ultra-violet light from which all visible light has been screened, playing upon a number of luminous or fluorescent substances which have been worked into harmless paints and are now being marketed by Luminous Products Co., 2437 Magnolia St., Oakland, California. R. C. Switzer, a young physicist of the University of California, evolved the luminous products and greatly enlarged the scope of colors possible for fluorescent effects. To popularize the use of these paints, a small assortment of seven colors together with sprayed sheets and instructions is being offered for $5.

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• CLAREMONT COLLEGE, near Pomona, Calif., in conjunction with Columbia University and the University of Chicago, is conducting research on "illumination as an aid to reading readiness." It is planned to hold a series of conferences and study groups upon this subject and to publish the findings nationally. George Rankin, director of lighting for the Southern California Edison Co. Ltd., has been asked to represent the utility at the Claremont College program.

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• IF SHOEMAKERS' CHILDREN often go without shoes, do the lighting experts' families go about in darkness? This question was asked of itself quite seriously by a Western utility. It made light tests in one of its offices, had the vision of its employees tested and immediately revamped the lighting. Office personnel to the extent of 85 per cent were found to have defective vision. Lighting intensities were raised from 11 to 25 foot-candles. Lamping was increased from 500 to 1,000 watts and the units were changed from semi- to total-indirect.

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• DRAMATIC TECHNIQUE is being applied to window lighting more and more. A brief "window shopping" expedition among outstanding metropolitan stores by one of the editors noted these significant uses of light: Clever application of spot-lights on a single dress or figure in the window; A darkened window in which the only light was a concentrated spot on the figure; Background color from a separate set of reflectors giving the "back drop" one color while a spotlight with a masked color frame played white light on the figure in the window; Extra light applied to rugs in a furniture window, from concealed sources in boxes and from behind screens; Nicely balanced design in arrangement of ornamental lamps and shades, all lighted.

...in Engineering

Tubes Provide A.C. Motor With D.C. Characteristics

A revolutionary new type of electric motor, utilizing a "stationary commutator" composed of electron tubes, has been developed by the General Electric Co. Known as the "Thyratron" motor, the new machine has a stationary armature and a revolving shield of the type used in synchronous motors. The armature, however, is provided with a special winding to utilize unidirectional current supplied from a group of full-wave rectifiers which operate from a three-phase, 60-cycle source. The revolving field is connected in series with the neutrals of the armature winding and as a result the motor, which takes power from a three-phase, 60-cycle supply has the characteristics of the direct current motor.

The Thyratron tubes perform two distinct functions, one being commutation and the other being grid-controlled rectification. In operation, the Thyratron rectifier is controlled by means of grids in the tubes so that power supplied to the motor windings is in the proper sequence and of an amount necessary to give the required torque for operation. Control is obtained by means of a small distributor mounted on one end of the motor shaft. Speed control is obtained by varying the voltage supply to the motor armature by means of a phase-shifting device acting upon the same grids in the Thyratron tubes. Through this method it is possible to obtain smooth speed control over the entire range for which the motor is designed. The grid control permits continuous power control over the entire range of operation from minimum to maximum speed without wasting power in resistance.

Features of the new motor include characteristics of a series type direct current machine; speed that is independent of the frequency of the power supply; smooth speed control over the full operating range; and a high efficiency and a relatively flat efficiency curve, (a distinct advantage in the lower portion of the speed range). One motor rated 400 hp. at 625 r.p.m. and 75 hp. at 350 r.p.m. has been built and tested. This motor is used for driving an induced draft fan, the characteristics of the new design being particularly applicable for driving such auxiliaries as fans, centrifugal pump, compressors and similar equipment having load characteristics such that the series type of motor can be used to an advantage.

Engineers' Council Aids Young Engineers

Entering its third year of activity, the Engineers' Council for Professional Development is carrying on two phases of important engineering work which should arouse enthusiasm among engineers throughout the country. The first of these phases is that dealing with the guidance and selection of young men in secondary schools who are interested in entering engineering schools and wish to follow an engineering career. Local engineering sections of the Founders Societies are requested to organize local committees to work with authorities of secondary schools so that advice and guidance of professional engineers in the community will be made available to aid young men who wish to enter the engineering field.

The second phase of the program concerns that dealing with the stimulation development of younger engineers. To this end the committee has developed a pamphlet of "Suggestions for Junior Engineers" which may be secured at a small fee of 10 cents per copy from the office of the Engineers' Council for Professional Development, 27 West 39th St., New York City, N.Y. This pamphlet contains a scheme of self-appraisal and a recommended reading list for junior engineers which includes a wide selection of reading in art, sciences, literature and travel.

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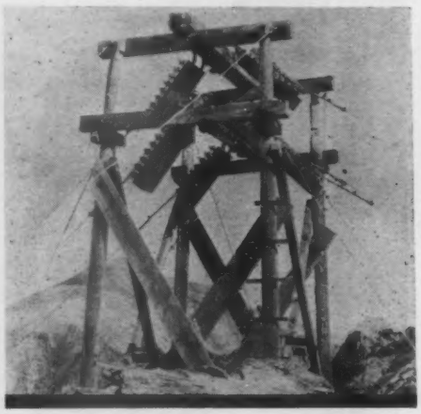
Early Strain Insulators



Through the courtesy of J. A. Clay, general manager of the Western Colorado Power Co., we are able to present this picture of the tower forming one end of a long span on a 11-kv. transmission line which went into service in 1895. Erected originally by the Telluride Power Co., this line functioned satisfactorily many years in the rigorous conditions imposed by a 13,000-ft. elevation. Interesting are the series of pin-type glass insulators which served as a substitute for modern strain insulators of the suspension type

... in Contemporary Reading

ELECTRON TUBES IN INDUSTRY, by Keith Henney, associate editor, Electronics. 583 pages, illustrated, 4½x7 in., price $5. Published by the McGraw-Hill Book Co. For sale by the McGraw-Hill Retail Room, 883 Mission St., San Francisco. This book fills a long felt need for assemblying data and material on the theory and practical application of electronic devices in industry. Subject matter of this book covers the fundamentals of the electronic tube circuits, amplifiers, power tubes, photo-electric cells and the improved control circuits which have been made possible by their use. The practical application of these devices is covered thoroughly and in a manner which should make this book valuable both as a text for the student and a guide for the industrial power and control engineer.

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AUTOMATIC PROTECTION OF A. C. CIRCUITS, by G. W. Stubbings. For sale by the Instruments Publishing Co., Pittsburgh, Pa. Price $5.00. This book deals with the subject of automatic protection in a logical manner, preceding the chapters on the protection of electrical machiney, the protection of cables and transmission lines, the testing and maintenance of protective gear with a thorough discussion of protective transformers, the interconnection of currents and voltage transformers and symmetrical components.

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THE THEORY OF ALTERNATING CURRENT WAVE FORMS, by Phillip E. Kemp, head of the School of Engineering at The Polytechnic, London. Sold by the Instruments Publishing Co., Pittsburgh, Pa. Price $4.50. This book presents the mathematical treatment of the properties of complex waves and discusses the effect of iron and circuit conditions, commonly found in practice, upon commercial wave forms. Suitable for a text for advanced students in alternating current theory and a handy reference for electrical machine designers.

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AIR CONDITIONING HANDBOOK—Probably the most complete work on air conditioning yet published is the new American Society of Heating & Ventilating Engineers' guide for 1935 which is said to be practically indispensable for anyone interested in the promotion and sale of air conditioning installations. For convenience the guide is bound in a red flexible binding, 6x9 in. in size and is conveniently indexed for reference to the 41 chapters covering every phase of the air conditioning installation. In addition to 728 pages of technical data, there are 224 pages of catalog data on current types of equipment. The price is $5 and the book can be secured from the offices of the Society at 51 Madison Ave., New York City, N. Y.

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PRINCIPLES OF ALTERNATING CURRENTS—by Ralph R. Lawrence, Prof. of Electrical Machinery, Massachusetts Institute of Technology. Second Edition. Published by McGraw-Hill Book Co., 5½ x 8¼ in. Fabricoid bound. Price $4. For sale by the McGraw-Hill Retail Room, 883 Mission St., San Francisco, Calif. This book, the first edition of which has been widely used as a college text on alternating currents, has been amplified to include new material on harmonics, couple circuits and wave filters. The chapters on symmetrical components and transmissions line calculations are of especial value from both the educational and practical standpoints.

News of Note + + +

Power Commission Survey Claims Power Shortage

Existence of a potential deficiency of 4,000,000 kilowatts representing 15 plants requiring $300,000,000 to finance them, is claimed in an interim report of the National Power Survey being made by the Federal Power Commission. Present-day excess is admitted in many territories including Idaho, Utah, New Mexico, Montana, Washington and Oregon. But the report states that resumption of normal industrial activity will create "critical shortages in almost every section of the United States."

Offsetting the reporting, is a statement issued by Bernard F. Weadock, vice-president and managing director of the Edison Electric Institute in which he points out that for the country as a whole there exists an excess of 20 per cent or nearly 6,000,000 kilowatts. These totals, he states, do not include the plants now being built by the Federal Government.

The power commission's survey points out that "power generated during January, 1935, was 10 per cent in excess of that for the previous January and was approximately equal to the amount generated during January, 1929. If the persistent growth in demand for power experienced during the past years continues during this current year, power generation for 1935 will exceed 1929 and establish a new all-time record."

Advantage has been taken of the survey by proponents of the Central Valley Water Project in California to endeavor to secure an initial allotment of $25,000,000 from the $4,880,000,000 Public Works Fund. California officials have been in Washington during the past month endeavoring to obtain authorization for this project.

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L. A. Frequency Change Finally Announced

Definite announcement that the system of the Los Angeles Bureau of Power & Light will change over from 50 to 60 cycles upon completion of the initial installation at Boulder Dam has been made by E. F. Scattergood, chief electrical engineer and general manager of the bureau. Estimated cost of the cutover is placed at $3,250,000, most of which will be expended on consumers' equipment.

Major work will involve changes on motors in industrial plants which are estimated to involve 50 per cent of the present equipment now served. In addition, elevators, cooling and ventilating systems and thousands of domestic electric refrigerators will be involved. Other small motor-driven machinery in homes with the exception of electric clocks will not be affected by the frequency change. Work on the changeover is to be started shortly after January 1, 1936.

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California Legislature Considers Utility Bills

Included among the measures affecting public utilities still being considered by the California State Legislature are a series of six bills authorizing revenue bonds for various types of public ownership projects. These include:

SB 704, 705 and 706, authorizing revenue bonds for irrigation districts. These measures have been passed by the senate.

AB 1165 approving revenue bonds by majority vote in practically all types of political subdivisions.

SB 78 permitting revenue bonds for city and county projects.

AB 2102 providing for rural electrification through revenue bonds issued by publicly owned electric membership corporations.

These measures are similar to the so-called Ickes bills recommended to various state legislatures by the Secretary of the Interior so as to facilitate securing PWA loans for the establishment of municipal utilities.

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Edison Company Announces $73,000,000 Refunding Plan

Southern California Edison Co., Ltd., has received authorization from the Securities & Exchange Commission as well as the California Railroad Commission to issue $73,000,000 of face value of its refunding mortgage gold bonds bearing 3¾ per cent interest and due in 1960. This is one of the largest refundings under the new S.E.C. regulations and follows the recent $45,000,000 refunding program of the Pacific Gas and Electric Co.

Proceeds of the issue are to retire $68,360,000 of present outstanding bonds bearing 5 per cent interest and due in 1939 and 1951. The remainder of the issue will reimburse the company's treasury for capital expenditures already made in the sum of $4,640,000. It is estimated that the refunding operations will affect an annual saving of $473,137.

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• ANNOUNCEMENT has been made in Santa Ana, Calif., papers of a purchase by the Radio Corporation of America, of an 80-acre tract near Newport Beach on which a big commercial inter-ocean telegraph station is to be erected.

Northwest Engineers Meet In Seattle May 9-11

The Engineering and Operation Section of the Northwest Electric Light & Power Association will meet for its twelfth annual conference in Seattle May 9 to 11, 1935. Headquarters will be at the Washington Hotel. William S. Hill, Grays Harbor Railway & Light Co. will preside as section chairman.

The program will be presented under the four committees: Production nad Generation by J. E. Yates, Pacific Power & Light Co., chairman; Transmission and Distribution by Tom Purton, Idaho Power Co., chairman; Utilization by Paul P. Ashworth, Utah Power & Light Co., chairman; and General, covering accident prevention and other subjects not classified in the above, by J. B. Fisken, The Washington Water Power Co., chairman.

Subjects to be discussed in the generation, transmission and distribution groups are chiefly on operating problems. These cover problems encountered in the field in hydro, steam and Diesel production, in eliminating radio interference in transmission lines and in checking loads on distribution lines. Howard Melvin, Electric Bond & Share Co., New York, will discuss the latest theory and practice of electrical transmission.

In the Utilization Committee, the experiences of member companies with sequence metering will be reported. Bearing directly on load building will be a progress report on new or unusual uses, a progress report on the adequacy of wiring, a home illumination survey, and a discussion of industrial surveys for load building. The accident prevention Committee will bring its 1934 statistics up to date, and discuss accident prevention methods and costs.

An address on a timely subject by an executive of one of the Northwest utility companies is also to be a feature of the program.

The local committee on arrangement consists of George Quinan, chairman, A. R. Pollard, George C. Sears, Joseph Hellenthal, Magnus Crawford, all of the Puget Sound Power & Light Co., Seattle.

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• RATES of the Sierra Pacific Power Co. were ordered reduced in a show cause order issued by the Nevada Public Service Commission effective May 1. Domestic lighting rates in Reno and Sparks are ordered reduced from 7 cents for the first 150 kw-hr. to 6½ cents for 60 kw.hr. The reduction also was ordered in the combination lighting and cooking rate.

P. C. E. A. Prize Winners Announced At Fresno Joint Conclave

WITH 726 papers entered covering all phases of the problems confronting the electrical industry, the prize contest sponsored by the Pacific Coast Electrical Association was concluded with a joint session of the Business Development and Engineering Economics section of the organization at Fresno, April 11 and 12. Over 200 attended the sessions at which the three prize winning solutions for each of the eight problems were presented.

As finally determined by the judges (members of the guidance committees of the two sections), the awards were as follows:

PROBLEM No. 1.—"From an operating standpoint, what types and how much load can be added to existing facilities?":

First Prize ($50): S. M. Micheal, power salesman, Pacific Gas and Electric Co., Redwood City.

Second Prize ($25): Alex A. Kroneberg, assistant operating engineer, Southern California Edison Co., Los Angeles.

Third Prize ($10): R. A. Havener, serviceman, Southern Sierras Power Co., Searles Lake.

PROBLEM No. 2.—"How can the cost of electric distribution be lowered?":

First Prize ($50): Henry H. Buell, superintendent of electric distribution, Pacific Gas and Electric Co., San Jose.

Second Prize ($25): F. S. Benson, assistant engineer, department of engineering, Pacific Gas and Electric Co., San Francisco.

Third Prize ($10): Stanley A. Ward, test department, Southern California Edison Co., Los Angeles.

PROBLEM No. 3.—"How important is voltage regulation? What are the most practical and economical methods of accomplishing it?":

First Prize ($50): H. H. Minor, distribution engineer, San Joaquin Light & Power Corp., Fresno.

Second Prize ($25): Frank H. Streit, assistant engineer, Los Angeles Gas and Electric Corp., Los Angeles.

Third Prize ($10): V. E. Leech, station chief, Southern California Edison Co., Pasadena.

PROBLEM No. 4.—"How much repair and maintenance service can and should the power companies give their consumers?":

First Prize ($50): H. L. Smith, district agent, Pacific Gas and Electric Co., East Nicolaus.

Second Prize ($25): W. N. Lindblad, assistant engineer, bureau of tests and inspection, Pacific Gas and Electric Co., Emeryville.

Third Prize ($10): V. E. Dodson, sales department, General Electric Co., Los Angeles.

PROBLEM No. 5.—"What are the most effective methods of increasing the domestic use of electricity?":

First Prize ($50): Howard H. Bullock, sales department, General Electric Co., Los Angeles.

Second Prize ($25): E. P. Pennebaker, district storekeeper, Southern Sierras Power Co., El Centro.

Third Prize ($10): David S. Bromley, station chief, Southern Sierras Power Co., Bishop.

PROBLEM No. 6.—"What are the most effective methods for increasing the commercial, industrial and agricultural uses of electricity?":

First Prize ($50): Paul H. Yelton, station chief, Southern Sierras Power Co., Victorville.

Second Prize ($25): Allen L. Laws, assistant to the new business manager, Southern California Edison Co., Los Angeles.

Third Prize ($10): W. R. Bowler, gas and electric sales, Pacific Gas and Electric Co., San Jose.

PROBLEM No. 7—"What are the most effective methods of improving customer goodwill?":

First Prize ($50): H. A. Lott, operating department, Southern California Edison Co., Alhambra.

Second Prize ($25): J. A. Corlett, sales department, General Electric Co., Los Angeles.

Third Prize ($10): G. G. Bryne, sales department, Coast Counties Gas & Electric Co., Watsonville.

PROBLEM No. 8—"What are the most effective methods of improving cooperation within the industry?":

First Prize ($50): Walter N. Koskinen, sales department, Pacific Gas and Electric Co., Oakland.

Second Prize ($25): Arthur H. Halloran, radio engineer, San Francisco.

Third Prize ($10): W. F. Jones, accounting department, Southern Sierras Power Co., Riverside.

Fifteen other papers approached so closely to the prize winners that judging them was particularly difficult. These were awarded honorable mention by the judges and were submitted by the following:

Fred R. Groch, Wesix, Inc., San Francisco; A. S. Hoke, Coast Counties Gas & Electric Co., Santa Cruz; W. F. Jones, Southern Sierras Power Co., Riverside; C. N. Parker, Southern Sierras Power Co., Riverside; Chris Goldkamp, San Diego Cons. Gas & Elec. Co., San Diego; Herbert Knopf, Pacific Gas & Electric Co., San Rafael; A. M. Jepperson, Pacific Gas & Electric Co., San Jose. Joe Mini, Pacific Gas & Electric Co., San Francisco; R. J. Cobban, Westinghouse Elec. & Mfg. Co., San Francisco; A. Balchin, Pacific Gas & Electric Co., Salinas; H. B. Tubbs, General Electric Co., Los Angeles; Francis J. Crocker, Southern Sierras Power Co., Palm Springs; Ruth E. Creveling, San Diego Cons. Gas & Elec. Co., San Diego; N. H. Callard, Westinghouse Elec. & Mfg. Co., San Francisco; Florence Couper, General Electric Co., San Francisco.

Interest in the presentation of the papers was maintained throughout the conclave sessions by concealing the actual standing of the three papers read until the banquet which closed the second day of the conclave. Prizes were awarded by President A. H. Markwart at the banquet.

In opening the sessions President Markwart commended the association membership for the interest shown in the contest. Of the 726 solutions submitted, 677 came from utility employees and 49 from employees of manufacturers and wholesalers. One association member out of every three wrote a solution to one of the problems. President Markwart said:

"Our thought was that there have been many in the industry with ideas which have been suppressed; some merely because there has been no convenient outlet for their expression, others because of a feeling that that since they were contrary to traditional lines of thought in the industry, voicing them would prejudice the position of the spokesman.

"We feel that our contest removed both these barriers by providing everyone with an opportunity to present his thoughts, knowing they would receive serious consideration without personal jeopardy. Moreover, we think this is the first time the association has not selected those to do the talking. Heretofore the contributors have been chosen, whereas now we have selected subjects for discussion, leaving the field open for all who cared to express themselves.

"We feel that to the very tangible value which the industry may receive from the many usable ideas which have been submitted, there is also an intangible value in the form of improvement in the psychological health of the industry."

In addition to the regular sessions at

the Fresno meetings, two general luncheons were held, at one of which Richard E. Smith, executive assistant, Southern California Edison Co., discussed "Politics and the Electrical Industry." Feature speaker at the banquet was Dr. George W. Allison of the Edison Electric Institute.

First prize papers in the contest will be one of the features of the June Convention-in-Print issue of ELECTRICAL WEST. Second and third prize papers will be published in subsequent issues. In addition there will be published a resume of the useable ideas presented in all of the papers submitted.

There follows a list of all those who presented papers on the eight problems:

PROBLEM NO. 1

From An Operating Standpoint What Types And How Much Load Can Be Added To Existing Electrical Facilities?

Pacific Gas and Electric Co.
- Arthur K. Ingraham, Supervising Designer.
- G. S. Tune, Supervising Designer
- F. F. Loder, Foreman
- S. M. Michael, Sales Dept.
- A. L. Gaenicke, Electric Meter Tester
- V. F. Escourt, Efficiency Engineer
- Frank Cunner, Foreman
- Jos. Mini, Jr., Assistant Chief
- R. Vance Pearson, Operator

San Diego Consolidated Gas & Electric Co.
- Joseph Sinnott, Electric Meter Dept.

Southern California Edison Co., Ltd.
- Alex A. Kroneberg, General Office
- Jason C. Carey, District Superintendent
- Fred B. Doolittle, General Office
- Louis Ludekens, Testman
- Ray K. Klumb, Station Operator

Southern Sierras Power Co.
- W. F. Jones, Accountant
- C. M. Lindsley, Radio Engineer
- A. R. Hevener, Patrolman

Miscellaneous
- M. H. Schnapp, General Elec. Co., San Francisco
- Fred R. Groch, Wesix, Inc., San Francisco
- H. H. Sharon, General Electric Co., Ontario

PROBLEM NO. 2

How Can the Cost of Electric Distribution Be Lowered?

Pacific Gas and Electric Co.
- Ernest Berger, Estimator
- Crawford Hill, Inspector
- E. M. Wright, Assistant Engineer
- L. E. Wolbert, Assistant Superintendent
- F. S. Benson, Assistant Engineer
- Herbert Knopf, Electric Supt.
- R. P. Lutzi, Superintendent Underground Distribution
- C. B. Nelson, Supervisor, Estimates & Records
- P. J. Freygang, Assistant Supt.
- Henry H. Buell, Superintendent Electric Distribution
- A. W. Flippen, Electric Substation Foreman
- C. R. Machen, Estimator
- F. H. Klippel, Superintendent of Lines

San Diego Consolidated Gas & Electric Co.
- Chris Goldkamp, Electric Meter Dept.

Southern California Edison Co., Ltd.
- Stanley A. Ward, Testman
- Vernon E. Leech, Station Chief
- H. M. Stewart, General Office
- Frank P. Mooney, District Superintendent
- Henry Breske, Clerk

Southern Sierras Power Co.
- W. F. Jones, Accountant
- W. B. Loper, Engineer
- H. J. Schomberg, Engineer
- L. W. Bently, Superintendent
- C. N. Parker, Surveyor and Engineer
- H. H. Miller, Inspector

San Joaquin Light & Power Corp.
- H. H. Minor, Distribution Engineer.

Miscellaneous
- O. A. Gustafson, General Electric Co., Los Angeles
- R. K. Corwin, Coast Counties Gas & Elec. Co., Santa Cruz
- A. S. Hoke, Coast Counties Gas & Elec. Co., Santa Cruz
- J. S. Spurck, General Electric Co., Los Angeles
- H. H. Sharon, General Electric Co., Ontario

PROBLEM NO. 3

How Important is Voltage Regulation? What Are the Most Practical and Economical Methods of Accomplishing It?

Pacific Gas and Electric Co.
- L. E. Wolbert, Assistant Superintendent
- E. A. McGinty, Superintendent Electric Sub-Stations
- E. R. Daniel, Estimator
- I. W. Collins, Load Dispatcher
- A. M. Jeppesen, Assistant Superintendent, Electric Distribution
- Paul Knapp, Lineman
- Maynard R. Born, Assistant Efficiency Engineer

Southern California Edison Co., Ltd.
- Vernon E. Leech, Station Chief
- Kyle M. Stevens, Testman
- Edw. Freeman, Testman
- R. R. Myers, Relief Operator

San Joaquin Light & Power Corp.
- Paul King, District Foreman
- C. E. Dyer, Substation Inspector

Miscellaneous:
- J. C. Porter, General Electric Co., Los Angeles
- R. J. Cobban, Westinghouse Elec. & Mfg. Co., San Francisco
- C. A. Andrews, Westinghouse Electric & Mfg. Co., San Francisco
- C. C. Potts, Westinghouse Electric & Mfg. Co., Los Angeles
- Frank D. Beardsley, Coast Counties Gas & Elec., Santa Cruz
- Joseph F. Sinnott, San Diego Consolidated Gas & Elec.
- Frank H. Streit, Los Angeles Gas & Elec., Los Angeles
- H. H. Sharon, General Elec. Co., Ontario

PROBLEM NO. 4

How Much Free Repair or Maintenance Service Can and Should the Power Companies Give Their Consumers?

Pacific Gas and Electric Co.
- Crawford Hill, Inspector
- R. B. Cain, Electric Range Repairman
- Hugh F. Flynn, Foreman
- George H. Searle, Supt. Services & Meters Dept.
- Carl W. Smith, Assistant Engineer
- F. S. Benson, Assistant Engineer
- A. Balchin, District Electric Supt.
- Rupert Wall, Assistant Superintendent
- Fred Peterson, Meter Tester
- E. W. Deane, Estimator
- W. L. Walsh, Range Serviceman
- H. L. Smith, District Agent
- C. E. Sherman, Jr., Electric Appliance Repairman
- Mrs. L. A. Box, Clerk
- W. N. Lindblad, Assistant Engineer
- J. M. Renfrew, Supt., Steam Dept.

Southern California Edison Co., Ltd.
- W. S. Houseworth, District Superintendent
- George Killman, Troubleman
- Amber G. Andersgaard, General Office
- Larry Cox, Assistant Cashier
- Howard E. Anderson, E.D.S. Clerk
- Ida Major, Cashier
- M. A. Voisinet, Credit Agent
- Thomas B. Owen, Station Chief
- P. E. Parker, Testman
- George C. Shinn, Testman
- H. C. Englar, E.D.S. Clerk
- George F. Hinthorn, Storekeeper
- Wm. D. Selleck, General Office
- James R. Campbell, Garage Mechanic
- Guy Riherd, Meter Reader
- H. D. Nesbit, Operator
- Gearald E. Smith, Range & Refrigeration Repairman
- Wm. J. Winchester, Troubleman

Southern Sierras Power Co.
- Francis F. Crocker, Local Agent
- R. O. Matthew, Appliance Service Man
- Carl A. Fulkerson, Serviceman
- R. L. Simpson, Groundman
- J. P. Rexer, Foreman
- Arthur L. Mullin, Serviceman
- Jack Darling, Operator
- W. P. Symons, Relief Operator

Miscellaneous
- Roy O. Mead, Coast Counties Gas & Elec. Co., Gilroy
- Wirt Thomas, Coast Counties Gas & Elec. Co., Gilroy
- V. E. Dodson, General Electric Co., Los Angeles
- L. O. B. Lindstrom, General Electric Co., San Francisco
- H. H. Sharon, General Electric Co., Ontario
- H. B. Tubbs, General Electric Co., Los Angeles

PROBLEM NO. 5

What Are the Most Effective Methods of Increasing Domestic Use of Electricity?

Pacific Gas and Electric Co.
- W. T. Hannum, Assistant Engineer
- Leo D. Murphy (2 papers) Assistant Engineer
- Graydon A. Milton, Sales Department
- R. Vance Pearson, Operator
- Frank Talcott, Sales Manager
- L. C. Edwards, Laboratory Assistant & Inspector
- H. E. Thomas, Laboratory Assistant & Inspector
- Jack H. Martin
- W. J. Crabbe, District Manager
- Arthur K. Ingraham, Supervising Designer
- T. C. Knite, Sales Department
- Frank Lovell, Sales Department
- Edwin C. Rosenberg, Sales Department
- C. C. McRae, Sales Department
- P. F. Leverenz, Sales Department
- Fred C. Ensinger, Sales Department
- Thor W. Christensen, Sales Department
- Mrs. L. A. Box, Clerk
- Miss Peggy O'Mahony, Clerk

San Diego Consolidated Gas & Electric Co.
- C. M. Dove, Billing Department
- Rowan Cooley, PBX Operator
- Paul Gray, Order Department

Southern Salifornia Edison Co., Ltd.
- Dennis Gregory, Meter Reader
- C. L. Ashley, General Office
- C. D. Smith, Chief Bookkeeper
- F. C. Galland, Assistant Station Chief
- Anton Dahl, Field Clerk
- D. H. Miller, Jr., Lighting Specialist
- Ralph Allen, Power Bookkeeper
- Olive Bowman, Control Clerk
- T. W. Smith, On and Off Man and Collector
- Volney C. Brown, Sales Bookkeeper
- Sebert Stevenson, Testman
- Francis V. Vestal, New Business Clerk
- L. A. Walker, Operator
- A. S. Price, Dispatcher
- Frieda Redman, Cashier and Combination Bookkeeper
- A. Stanley Clem, Water Heater Specialist
- Durant L. Danielson, Sales Bookkeeper
- F. B. Hornbeak, Chief Clerk
- W. K. Bercaw, Power Bookkeeper

Abigail Brown Johnson, Stenographer
Fred B. Doolittle, General Office
A. P. Sessions, General Office
W. H. Brown, Foreman
H. Moore, General Office
Netty Lynch, General Office
William Pons, Assistant Chief Collector
Edna C. Patterson, General Office
B. J. Dean, Operator
Maryan E. Hope, Addressograph Operator
A. D. Irion, Assistant Test Engineer
Harold S. Moody, Testman
Ernest B. Evans, Testman
John Davies, Operator
Norman F. Brown, General Office
C. E. Ellis, Truck Driver
H. J. Letts, General Office
Lloyd F. Hunt, General Office
M. G. Barnes, Collector
D. C. Murphy, Clerk
H. A. Lott, Chief Dispatcher
Elsie Christensen, General Office
Prentis C. Hale, General Office
Mary Ann Zellars, General Office
Robert W. Kelso, General Office
Charles E. Jones, Power Bookkeeper
D. W. Emmons, Counter Clerk
Robert C. Green, Station Chief
L. D. Smith, Utilityman
V. E. Leech, Station Chief
A. F. Harris, Foreman General Store
Harry M. Snow, Meter Reader
Robert G. Robinson, Collector
P. Chambers, Lighting Specialist
F. Westmancote, General Office
Ruth V. Boe, Burroughs Bookkeeper
M. E. Taylor, Counter Clerk
O. P. Dyar, Testman
Martha M. Hobbs, Stenographer
Frank A. Redding, Meter Testing
Olive V. Cordrey, Clerk
B. W. Fordham, Telephone & Alarm Engineer
Phillip Nevins, Assistant Bookkeeper File Clerk
V. B. Landis, Dealer Contact Man
Eva Manning, Clerk
Myrtle L. Douglass, Trouble Bookkeeper
F. Willard Nelson, Division Chief Clerk
Mildred Phillips, Stenographer
Loren E. Otis, Burroughs Operator
Guy A. Nicolls, Power Bookkeeper
John C. Fisher, Add Clerk
J. A. Swalwell, Dealer Contact Man
William L. Burr, On and Off Man
W. J. McKay, Contract Clerk
C. E. Mann, Meter Reader
Paul D. Bishop, Collector
William S. Gibbs, Water Heating Specialist
R. H. Green, Collector and Meter Reader
Wm. C. Oglesby, Water Heater Specialist
Raymond G. Rittner, Head Control Bookkeeper
K. K. Allen, Div. Chief Bookkeeper
Dorothy Johnson, Switchboard Operator
M. M. Fraser, Stenographer and Clerk
Edw. C. Foster, Power Specialist
V. D. Williamson, Chief Clerk
Kathryn A. Kelley, Phones and File Clerk
J. A. Tucker, Contact Man
Alyce J. Taylor, Appliance Saleslady
S. H. Gordon, Collector
D. C. Hanson, Power Bookkeeper
Dorothy F. Heck, Stenographer
John L. Fenton, Mail Carrier
J. C. Baker, Lighting Specialist
Max H. McCann, Station Chief
Arthur C. Eklund, Chief Bookkeeper
R. B. Morris, Collector
D. R. Dickson, Assistant Sales Bookkeeper
Don C. Dunbar, General Office
C. F. Cornelius, Meter Reader
Geo. S. Walters, Lighting Gang Foreman
C. E. Sauers, E.D.S. Clerk
Mary Jo Herman, Bookkeeper
Josephine Hodson, Stenographer Clerk
H. E. Rhinehart, E.D.S. Clerk
C. A. Bain, Pri. Troubleman
C. V. Boquist, Local Agent Assistant
David T. Barber, Field Clerk, Class T
C. R. Hull, Appliance Serviceman
J. R. Zeigler, Engineer
D. P. Proctor, Local Agent
F. V. Gillum, Test Electrician
L. F. Ballmer, Station Chief
Betty Yingling, Clerk
Patricia Howard, Mail Clerk
Ruth Kneller, Machine Biller
Curtis M. Mullins, Mail Carrier
Paul T. Newland, Cashier
A. L. Nowels, On and Off Man
Dwight M. Overmyer, Load Checker
Allen S. Paul, Collection Department
D. B. McNamara, Collection Department
Dorothy R. Nolan, Clerk
L. S. Peterman, Power Specialist
Fay Putnam, Comp. Operator
D. B. Ramer, Chief Bookeeper
Elmer F. Sheets, Water Heating Specialist
Elmer Snores, Power Bookkeeper
Kathryn Darr, Stenographer
Cecil Blasingame, Service Gang Foreman
Cora McGuire, Cashier
W. L. Warren, General Office
Louise Wilson, General Office
Esther MacLaughlin, Trouble Clerk
Carl Diederich, Meter Reader
S. H. Bragg, Pr. Ledger Bookkeeper
V. M. Field, Sales Bookkeeper
Freda Hamilton, File Clerk
J. L. Tong, Meter Reader
John H. Trickey, Meter Reader
George Gilmore, Local Agent
Harold Grimes, E.D.S. Clerk
Kathryn Logan, Stenographer
Faye G. Bortz, Order Clerk
Roy Cumpstom, Assistant Cashier
Clint W. Dozier, Meter Reader
Howard Gilmore, Clerk
Lela M. McDanel, Billing Clerk
V. A. Olsen, Sales Bookkeeper
Dorothy Rose Young, Assistant Cashier
L. A. Mushrush, Meter Reader
W. C. Woolley, Meter Reader
J. W. Jones, Field Clerk
F. S. Kelser, Sales Bookkeeper
H. A. Lott, Chief Dispatcher
H. M. Gilmore, Water Heater Specialist

Southern Sierras Power Co.
Powell F. Helton, Superintendent
D. S. Bromley, Superintendent
Harold L. Pangborn, Construction Clerk
W. S. Muir, Storekeeper
E. P. Pennebaker, Storekeeper
C. A. Rochholtz, Chief Clerk
Geo. W. Coffey, Clerk
Alex M. Miller, Instrument Mechanic
C. A. Lytle, Chief Inspector
W. L. Bennington, Superintendent
Frank M. Rogers, Chief Clerk
S. N. Giddings, Meter Tester
Donald J. Burcher, Lineman

San Joaquin Light & Power Corp.
John Doda, Utility Man
Vern Redman, Salesman

Miscellaneous
L. D. Fowler, General Electric, Los Angeles
Howard H. Bullock, General Electric, Los Angeles
Arthur H. Halloran, Wholesaling Code Authority
Major M. Anderson, General Electric Supply Corp., Los Angeles
Bruce Brownlea, Westinghouse Electric Supply, San Jose
H. H. Sharon, General Electric Co., Ontario
Wm. C. F. West, Los Angeles Gas & Elec. Corp., Los Angeles
L. G. Gianini, Incandescent Lamp, G. E. Co., San Francisco
W. E. Carlson, Incandescent Lamp, General Elec. Co., San Francisco
Milo Cain, Coast Counties Gas & Elec. Co., Santa Cruz

PROBLEM NO. 6

What Are the Most Effective Methods of Increasing Commercial, Industrial and Agricultural Uses of Electricity?

Pacific Gas and Electric Co.
Crawford C. Hill, Inspector
R. Vance Pearson, Operator
Thos. C. Borneman, Foreman
W. R. Bowler, Sales Department
Fred W. Stiver, Operating Foreman
Alex H. Walls, Estimator
Rupert Wall, Assistant Superintendent, Operating Dept.
B. A. Miller, Sales Department
H. P. Humphreys, Sales Manager
Thor W. Christensen, Sales Department
K. W. Van Gundy, Sales Department
O. F. Anderson, Sales Department
P. F. Leverenz, Sales Department
H. V. Worthington, Power Surveyor
F. C. Ensinger, Sales Department
Mrs. L. A. Box, Clerk

Southern California Edison Co., Ltd.
V. A. Bloxham, Power Specialist
Allen L. Laws, General Office
John J. Love, Lighting Specialist
T. L. Van Law, Power Specialist
T. M. Hotchkiss, Engineer
Earl D. Minnick, Power Specialist
H. L. Rudolph, Electrician
Eugene B. Kruger, Lighting Specialist
Calvin G. Shores, Power Bookkeeper
Mary Belle Adams, Control Clerk
D. M. Terhune, Division Chief Clerk
George Sullivan, Power Specialist
Clair M. Earll, Lighting Gang Foreman
Effie Pott, Checker
F. H. Allen, Power Specialist
Paul deWey, Utility Clerk
Lolita Landis, Local Agent
Isaac Thompson, Power Specialist
E. L. Bowler, Assistant District Manager
B. F. Miller, Lighting Specialist
Wm. P. Gilmore, Power Specialist
Carl Gordon, Meter Reader
A. R. Arnold, Supervisor
Donald K. Grandey, Power Specialist
C. A. Connor, Station Operator
R. R. Freeman, Station Chief
Willard J. Keil, Power Specialist
Lyle W. Smith, Rural Power Specialist
F. L. Eley, General Office
R. B. McMillin, Testman
James M. Thorburn, Lighting Specialist
A. B. Foley, Lighting Specialist
Russell E. Thompson, Lighting Specialist
M. C. Worley, Mail Carrier
George H. Harman, Power Specialist
W. E. Thomson, Engineer
J. H. Peters, Lighting Specialist
J. E. Burns, Estimator
Phillip G. Gorth, Station Operator
Wm. D. Shelleck, General Office
M. R. Armstrong, General Office
W. A. Bouve, Power Specialist
Paul K. Churchill, Power Specialist
F. T. Schell, General Office
J. H. Dickens, Mail Carrier

Southern Sierras Power Co.
Gordon F. Black, Illuminating Engineer
Edw. M. Uhlig, Superintendent
W. F. Jones, Accountant
A. Frank Ayres, Engineer
P. H. Yelton, Superintendent
Earl A. Johns, Serviceman
Jack Darling, Operator
C. W. Hagerman, Cashier

Miscellaneous
Robt. G. Linderman, Incandescent Lamp Dept., General Elec. Co., Los Angeles
H. C. Hill, General Electric Co., Los Angeles
R. E. Johnson, General Co., Los Angeles
E. J. Cipperly, General Electric Co., Los Angeles
Franck Laine, Westinghouse Elec. & Mfg. Co., San Francisco

J. H. Fenton, Westinghouse Elec. & Mfg. Co., San Francisco
T. A. Reid, Westinghouse Elec. & Mfg. Co., San Francisco
S. E. Gamble, Westinghouse Elec. & Mfg. Co., Emeryville
L. O. B. Lindstrom, General Electric Co., San Francisco
H. H. Sharon, General Electric Co., Ontario

PROBLEM NO. 7

What Are the Most Effective Methods of Improving Customer Good-Will?

Pacific Gas and Electric Co.
K. L. Boosey, Supervisor of Collections
Paul Suransky, Engineering Assistant
Charles F. Annett, Estimator
Crawford C. Hill, Inspector
Hugh F. Flynn, Foreman
Wendell H. Kerr, District Agent
Chester H. Hefner, Troubleman
A. J. Petsche, District Agent
Zita Ferris, Typist-Clerk
Leslie C. Vogt, Troubleman
Frank J. Paula, Clerk, Consumers Records
R. Vance Pearson, Operator
L. C. Edwards, Laboratory Assistant and Inspector
H. E. Thomas, Laboratory Assistant and Inspector
Leslie M. Harper, Clerk
S. W. Robinson, Assistant Load Dispatcher
D. L. Hickey, Sales Department
L. E. Wolbert, Assistant Superintendent
C. C. Rogers, Engineer
Bert T. Fanning, Clerk
Chas. A. Meservey, Assistant Load Dispatcher
G. H. Saunders, District Agent
H. T. Sutcliffe, Assistant Engineer
Eugene C. Hersam, General Foreman
Howard Wilkie, Operator—Joint
Leo Dubinsky, Operator—Paper
A. M. Carah, Meter Reader
Alvera Bennett, Stenographer
John S. C. Ross, Sales Dept.
Ross G. Van Gundy, Sales Department
Paul C. Kondla, Sales Department
Emmett N. Britton, Sales Department
L. T. Cronkite, Sales Department
Wm. K. Towner, Sales Department
A. G. Ramstad, Sales Department
Fremont O. De Armond, Electric Superintendent
J. R. Gilbert, Meter Tester
W. B. Marks, Sales Department
Allen Higgins, Jr., Sales Department
Ward D. Hopkins, Sales Department
N. E. Nilsson, Meterman
G. Leslie Hill, Assistant Engineer
Raymond L. Palmer, Collector
Robert R. Snyder, Collector
Lewis L. Neubacher, Clerk
Arthur K. Ingraham, Supervising Designer
William G. Whitney, Assistant Superintendent.
George W. Graffis, Sales Dept.
C. N. Clarkson, Special Representative
John B. Hodgkins, Sales Department
H. E. Crowhurst, Utilityman
George Bonner, Inspector
W. P. Bear, Sales Engineer

San Diego Consolidated Gas & Electric Co.
W. E. LeRoy, Electric Distribution Dept.
Don Sylvester, Order Dept.
Ruth Creveling, Editor, New Meter, Librarian
Roland Brock, Record Department
Elmer Blossom, Order Department
Edward Rasmussen, Messenger
Edgar Grey, Storeroom Clerk
Thomas Vinton, Messenger
Herbert Corriere, Stores Department

Southern California Edison Co., Ltd.
James H. Todd, Estimator
Anne Glotzbach, Stenographer
Francis N. Edmunds, Collector
W. Trent German, General Office
Anton B. Hagen, Testman
Margaret Schneider, Clerk
J. E. Fiegel, Testman
Harold S. Myers, District Chief Clerk
T. A. Gidcomb, Meter Reader
L. L. Trickey, Assistant Cashier
Wm. P. Gilmore, Power Specialist
E. G. Lacey, Collector
W. G. Roll, Lineman
Edgar Grabau, On and Off Man
G. V. Barsch, Collector
C. K. Bradford, Testman
George S. Richardson, Water Heating Specialist
W. H. Mobley, Power Bookkeeper
J. R. Zeigler, Engineer
Josephine Thompson, Clerk
M. Walter Bott, District Credit Agent
Doris Walker, Stenographer
Lilah B. Esmay, Assistant Cashier
Thelma Jane Leonard, Stenographer, Clerk
Madelyn Hall, Machine Biller
A. L. Bartholomew, Collector
Virginia Miller, Clerk
W. K. Brown, Ledger Bookkeeper
C. F. Andrews, Credit Agent
S. Elizabeth Millen, Cashier
J. R. Zeigler, Engineer
Nema O. Teague, Telephone Operator
Majorie Snider, Clerk
G. R. Redfield, Meter Reader
Esther Van Aken, Addr. Operator
Edw. R. Baney, Collector
Raymond Wilcox, Co. Representative
Phares V. Breneman, Assistant Operator
Adwain Smith, Stenographer
A. A. Bray, Collector
Florence E. Shine, Saleslady
R. H. Drysdale, Petty Troubleman
Clarence F. Smith, Assistant Chief Collector
F. R. Chapman, Meter Reader
E. M. Storer, Clerk
Mills H. Beardsley, Assistant Cashier
Charles I. Reagan, Collector
Jack Van Wilt, Meter Reader
Louis C. Bowers, Meter Reader
Glenn R. Bjorklund, Bookkeeper
A. G. Simpson, Trouble Clerk
H. P. Baker, Field Clerk
Irene Marie Drott, Office Specialist
H. C. Thatcher, Power Specialist
Paul W. Cockrell, 1st Class Lineman
Thos. T. Alston, E.D.S. Clerk
Myrtle B. Fries, Adj. Clerk, Stenographer
H. P. Paul, Collector
R. J. Frenzel, Clerk
Virginia Gray, Collection Ledger Clerk
Marc R. Todd, Division Credit Agent
Fred L. Cronk, Service Department Clerk
Lily Seguin, Assistant Cashier
J. F. Stewart, Collector
C. O. Robinson, Meter Reader
Homer D. Neer, Off and On Troubleman
Jimmie M. Coleman, Bookkeeper
C. L. Comer, Assistant Cashier
Alex Lacy, Collector and Petty Troubleman
Rod Yould, Clerk
George R. Drysdale, District Chief Clerk
Clarence Mathews, Off and On Man
J. C. Prinslow, Off and On Man
Ruth W. Riley, Local Agent's Assistant
Rose Rauscher, Assistant Cashier
Olive Lund, Machine Biller
Robert H. Birkhead, Control Clerk
E. M. Tallon, General Office
L. E. Tarbox, Supt. Office Assistant
Theresa Nussbaum, Assistant Cashier
Ruth Wood, Bookkeeper
Heman B. Smith, Clerk
A. Z. Jones, Meter Reader
Lena Hilbert, Phone Operator
Phyllis Hoffman, Clerk and Stenographer
H. E. Landis, Assistant Power Bookkeeper
R. E. Jones, Meter Reader
Helen Lane, Assistant Adj. and Stenographer
Hattiebelle Lee, Bookkeeper
Claude G. Lindsey, Lighting Specialist
Lloyd L. Lofgren, Contract Clerk
R. D. Lowry, Meter Reader and Power Checker
A. V. Lundy, Meter Reader
G. N. MacKinnon, Head Clerk, Service Dept.
H. A. Medley, Collector
Anita Herdliska, Stenographer
George Glascock, Meter Reader
W. B. Cheney, General Office
Howard Hoffman, Assistant Power Bookkeeper
Kenneth H. Knowles, General Clerk
A. P. Sessions, General Office
Joseph A. Long, General Office
Joe Vivian, General Office
E. H. Pike, Collection Clerk
R. E. Brooker, General Office
R. C. Kiser, Credit Agent
C. W. Hackett, E.D.S. Clerk
Virginia Brown, Stenographer
M. A. Deemer, Assistant Chief Bookkeeper
Fred W. Van Name, Jr., Trouble Clerk
Bernard Gipson, Testman
Nellie McCall, General Office
Bert Conrad, Testman
Ethel Brown, Clerk
B. R. Loxley, Testman
S. P. Nash, Meter Reader
George T. Dorrance, Clerk
Elizabeth Walker, Trouble Clerk
Raymond C. Dick, Mail Carrier
H. H. Deeter, Closing Bill Clerk
H. J. Cameron, Cont. Fund Clerk
Lois B. Brown, Phones and File Clerk
L. I. Lambuth, Testman
D. Dunaway, Testman
Geo. B. Rice, Testman
W. L. Tyrrell, Private Troubleman
Erna B. Quast, Assistant Control Clerk
Carl M. Sellman, Credit Agent
Hazel Fessler, Cont. Fund Clerk
L. D. Anderson, Testman
George E. Link, Testman
Arthur B. Taylor, Testman
J. A. Liversage, Testman
C. L. Morrison, Bills Payable Clerk
Harry L. White, Power Specialist
S. H. Pearson, General Clerk
Ruby Ann Lips, Contract Clerk
J. E. B. Forster, Testman
Mae Sadler, General Office
F. A. Larson, Testman
Margaret McCulley, Typist
W. C. Berry, Patrol Helper
R. W. Kelso, General Office
H. N. Kemp, Assistant Power Specialist
John L. Beringer, Timekeeper
E. C. Frazier, General Office
Mary Shoop, General Office
W. A. Welday, Traveling Operator
B. D. Bunje, Station Chief
E. E. Givens, Station Operator
Jeannette D. Kearney, General Office
John L. Fitch, General Office
Robert L. Moore, General Office
Helen E. Jameson, PBX Operator
C. P. Thompson, On and Off Man
N. R. Hoskot, Meter Reader
R. C. Blankenburg, Testman
W. S. Randall, Filing Clerk
Alva M. Burnett, Junior Designer
Ruth H. Thomas, General Clerk
Wm. Beckham, Trouble Clerk
Dorothy Lawton, Saleswoman
R. R. Smith, Local Agent
Wm. K. Dunkle, District Chief Col.
Mary A. Perkins, Stenographer
Lillian Hatfield, Biller & Comp. Operator
George R. Cooper, New Business Clerk
F. W. Ennor, Merchandise Specialist
Walter McNeal, Janitor
N. Washburn, Cont. Fund Clerk
James F. Smith, Chief Clerk
Mrs. Lila M. Lofberg
Ray L. Little, Off & On Man and Collector

T. T. L. Jones, Collector and Off & On Man
G. E. Barker, Assistant Chief Operator
J. H. Halliwell, Utility Clerk
Edgar L. Roper, Collector
Hester V. Wood, Credit Clerk
J. S. Hurley, Clerk
Mildred M. Hoye, Control Clerk
Willard R. Glass, Credit Clerk
Irene Zane, Trouble Clerk
Dora Sunseri, Stenographer
James W. O'Brien, Power Specialist
Richard L. Tharp, Cashier
Edwin B. Green, Dealer Contact Man
P. C. Brown, Operator
J. R. Strain, Operator
Roy B. Cowden, Operator
H. C. Lamp, Division Clerk
L. E. Means, Test. Elect.
T. H. Jones, Chief Clerk
N. D. Woodward, Meter Reader, Collector
Katherine Little, Stenographer and Cashier
Florence Carlson, Cashier
Rachel McCall, Trouble Clerk
John W. Manuell, Testman
Judson T. Kessick, Meter Reader
William S. Ogan, On and Off Man
C. LeBorgne, Testman
D. O. Dodd, Estimator

Southern Sierras Power Co.
Harlow Alabaster, Salesman
R. B. Cole, Electrician, Relief Operator
Miss Mavis Vesty, Assistant Cashier
B. F. Himes, Superintendent
G. L. Christiansen, Commercial Engineer
Paul L. Emerson, Accountant
Borneo Stoker, Clerk
Rosamund Harries, Cashier
Roy Scudder, Collector
V. E. Johnson, Supt. of Steam Plant
R. G. Jones, Supt. of Meter Department
John F. Russell, Power Tester
Marjorie Bates, Secretary
Louis E. Cox, Clerk and Storekeeper
Clio E. Thomas, Chief Clerk
Howard Boylan, Statistician
F. C. Sollars, Agricultural Engineer
L. S. Powell, Serviceman

San Joaquin Light & Power Corp.
La Rue Smith, Meter Reader.
W. Weidemann, Serviceman
L. M. Mossman, Hot Tap Foreman
C. H. Edman, Salesman
Wilbur A. Macy, Collector
Gerald M. Stutsman, Cashier Clerk
Roy McGeorge, Gas Serviceman
R. W. Morrison, Accountant
Chas. L. Palmer, Advertising Man
J. C. Heaslett, New Business Clerk
H. R. Huber, Foreman's Clerk

Miscellaneous
G. G. Byrne, Coast Counties Gas & Elec. Company
E. F. Hockenbeamer, Coast Counties Gas & Elec. Co.
Loys Griswold, General Electric Co., Los Angeles
J. A. Corlett, General Electric Co., Los Angeles
H. A. Cordes, General Electric Co., Los Angeles
R. E. Bear, General Electric Co., Los Angeles
N. H. Callard, Westinghouse Electric & Mfg. Co., San Francisco
R. A. Hopkins, Westinghouse Elec. & Mfg. Co., San Francisco
F. J. Wellhouse, Westinghouse Elec. & Mfg. Co., San Francisco
John M. Morris, Westinghouse Elec. & Mfg. Co., Los Angeles
Florence Couper, General Electric Co., San Francisco
M. S. Barnes, General Electric Co., San Francisco
M. H. Gilbert, Westinghouse Elec. Supply, San Francisco
H. H. Sharon, General Electric Co., Ontario
Arthur H. Halloran, Wholesaling Code Authority, San Francisco
A. B. Gerhan, Engineer, San Francisco

PROBLEM NO. 8

What Are the Most Effective Methods of Improving Cooperation within the Industry?

Pacific Gas and Electric Co.
E. M. Beal, Estimator
A. L. Perdue, Sales Department
W. L. Greer, Sales Department
Walter N. Koskinen, Sales Department

Southern California Edison Co., Ltd.
W. P. McKnight, Operator
Ethel A. Hall, General Office
Clair M. Earll, Light Gang Foreman
J. L. Walbridge, Assistant Sales Bookkeeper
J. W. A. McIssac, Chief Bookkeeper

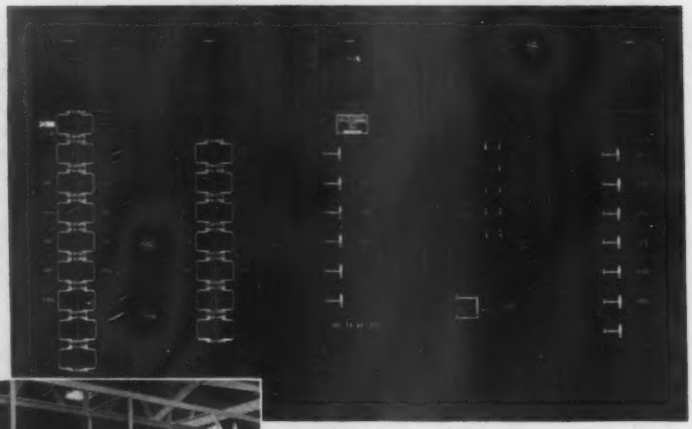
Southern Sierras Power Co.
W. F. Jones, Accountant
Edw. L. Neff, Operator
Powell F. Helton, Superintendent

Miscellaneous
H. H. Sharon, General Electric Co., Ontario
Arthur H. Halloran, Wholesaling Code Authority, San Francisco
R. C. Mixer, General Electric Supply, Los Angeles

•

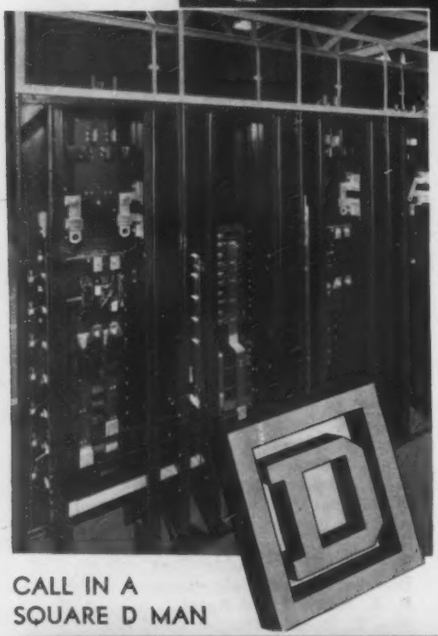
• GRAYBAR ELECTRIC CO., Seattle, has been awarded a contract by the city of Seattle to furnish and install refrigeration equipment in the Public Safety building. The contract, involving about $2,000, calls for installations in the jail kitchen, city hospital kitchen, bacteriological laboratory and basement.

NEWS
From a Seat of Learning



Square D Saflex Board, Chemistry Bldg., U.C.L.A.

Rear of panel showing wiring gutters.



In the new Chemistry Building at University of California at Los Angeles designed by Hunter & Hudson, consulting engineers, Square D made news when a Saflex Switchboard was installed for control of all light and power.

By this particular type of switchboard installation, Square D engineers saved not only an amazing amount of space, but a considerable amount of money. Power and light is now controlled practically, safely, conveniently.

The safe utility of a condensed Saflex installation is Square D's answer to requirements demanding a switchboard that will be satisfactory in cost, size and appearance for limited space conditions.

Specifications for this switchboard include 62 Saflex convertible switch units ranging from 30 amperes to 600 amperes capacity. Adequate provisions have been made for metering. The board is so arranged that all line and load side bussing terminates in concealed wiring gutters, eliminating unsightly wiring in rear of board.

CALL IN A SQUARE D MAN

SQUARE D COMPANY
ELECTRICAL EQUIPMENT
LOS ANGELES · SAN FRANCISCO · DENVER · HOUSTON
SQUARE D COMPANY · DETROIT · MILWAUKEE

San Diego Fair Exemplifies Best Garden Lighting

ELECTRICALLY the California-Pacific-International Exposition which opens May 29 at San Diego, Calif., will be completely different from the Chicago Century of Progress Exposition of the last two years. At the latter spectacular circus type of lighting was the feature of the event. At the San Diego fair quite the reverse type of lighting is contemplated for a number of reasons.

Ever since the 1915 exposition in San Diego, Balboa Park, in which the fair was held, has been maintained as a public park. The trees and shrubs, the wonderful flower gardens and patios planted at that time, have been nurtured and preserved ever since. Likewise, have the buildings of the Spanish-type of architecture. Meanwhile, the foliage has grown about the buildings in a way which is impossible at the ordinary exposition where planting is done in a hurry at the last moment after a final rush of building.

Opportunity will be had to present the utmost in subtlety and delicacy in the treatment of lighting on these gardens and buildings. It may be said that the San Diego exposition will be one of the finest examples in the world of the possibilities of garden lighting.

Two different schools of treatment will predominate. Otto K. Oleson, spectacular lighting showman of Hollywood, has been making experiments in the spectacular lighting of some of the great tree spaces and plans to work out numerous dramatic effects in the lighting of the domes and towers of the many buildings at the grounds. On the other hand, F. B. Nightingale, who has developed unique garden lighting equipment, has been assigned several of the gardens to light in his own particular style of artistry.

Many tests as to the colors to bring out best the foliage and the flowers of the various trees and shrubs, which themselves range from the tropical to those from the more familiar temperate zone. These tests to determine the best effects have been made during the past few weeks.

The one touch reminiscent of the Chicago World's Fair will be the lighting of the Ford Building tower which will have 18 navy-type searchlights trained upon it in a perpendicular plane. Situated at the end of the mesa, this will be visible 100 miles at sea and throughout the entire city.

F. F. Evenson, electrical engineer for the exposition, estimated that a total load of 10,000 kw. would be connected for the ground lighting and general lighting of the buildings. Exhibitors provide extra lighting wherever it is required and many spectacular exhibits are being planned.

Underwater lighting is being arranged in the lagoon at the botanical building and an electric fountain is to be installed at the botanical building which will be reflected in the pool below it.

The Travel and Transportation Building will be lighted by modernistic lighting effects. The beautiful Cabrillo bridge is also to be floodlighted in concealed color floods, coloring underneath the arches in harmonious colors.

•

Franchise Measure Loses In Los Angeles Election

The proposed city charter amendment which would permit the granting of a 35-year franchise to the Los Angeles Gas and Electric Corp for 2 per cent of its gross receipts was defeated by Los Angeles, Calif., voters in a municipal primary election held April 2. The complete unofficial vote was yes 80,380, no 174,970. Opponents of the proposed amendment had contended that the special franchise, had it been provided for, would have given the company a basis for valuation claims which would have been a stumbling block in the way of possible purchase of the company's electric system.

The corporation is under a court order to obtain a new gas franchise for the distribution of gas for heating and power purposes by next July. Present charter provisions will allow a 21-year franchise. Confusion will exist in the matter of distributing gas as the result of the defeat of the measure, according to gas company officials. Defeat of the measure leaves the situation in a state of confusion until a determination of the matter is reached by legal authority, it was stated.

•

Northwest Accountants To Meet in June

The Accounting and Business Practice Section of the Northwest Electric Light & Power Association will meet in Portland June 17 and 18, 1935. The headquarters hotel is not yet picked. R. E. Brennan, Portland General Electric Co. is chairman of the section.

A varied program including discussions of accounting routine and general subjects of interest to accounting departments is being prepared. Credits and collections, customer contacts, physical property retirements, budgetary control, and general statement procedure are among the subjects listed. In addition an explanation of the Securities and Exchange Acts by Herbert W. McIntosh, is also on the program.

Bids Submitted For Bonneville Turbines

S. Morgan Smith Co., York, Pa., was low bidder for the design and manufacture of two 60,000 hp. and one 5,000 hp. turbine and governing equipment for the initial installation at Bonneville on the Columbia River. The price was $1,135,329. The I. P. Morris Division of the Baldwin-Southwark Corp. bid $1,234,478 and Allis-Chalmers Mfg. Co. bid $1,270,319. All bids were on the basis of f.o.b. factory.

Specifications required bidders to submit guaranteed efficiency ratings on the larger units at three capacities and three heads, namely, 25,000, 40,000 and 60,000 hp. and 50, 55 and 60 ft. heads. The smaller turbine, similarly, was to be rated as to efficiencies at 2,100, 3,300 and 5,000 hp. under the same heads. No bids on turbines of either size were to be considered if the guarantee by the bidder averaged less than 86 per cent for all the nine efficiencies.

Promptly after the award of the contract the contractor will be required to build a test model as nearly 16 in. in diameter as practicable, exactly homologuos to the 60,000-hp. turbine. The blades of the model runner are to be manually adjustable to angles conforming to the proto-type and the hub is to be arranged for substitution of blades of alternate design to permit the development of a design which will provide satisfactory characteristics at chosen speeds. The requirements are that the model shall be of sufficient strength to be actually tested under a head of 69 ft. The contractor is expected to make tests with various runner designs to determine the one that shall best conform to the various head and load required at the specified speed of 75 r.p.m.

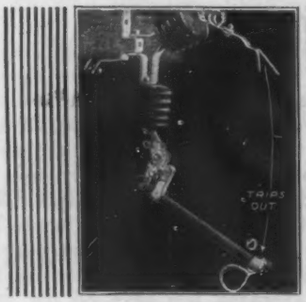
The turbines are to be of the single-runner, vertical-shaft type installed in concrete scroll cases with adjustable blade propellers, the blades to be automatically moved by governor or equivalent action simultaneously with or quickly following movement of the control gates so that the runner blades promptly assume the most advantageous and efficient blade position corresponding to each position of the regulating gate. The no-load, run-away speed when coupled to the generator is specified to be not more than 200 r.p.m. at 69 ft. head with full gate opening and with runner blades at an angle to give the highest run-away speed.

•

• GENERAL ELECTRIC CO. has formally opened its experimental house at Nela Park. It has as its purpose research in better living. From it will be determined whether low cost construction and full electric equipment can be worked out on a unit basis.

WHERE TO BUY . . . IN THE WEST

KEARNEY
TRIP OUT
FUSE SWITCH



Point pressure contacts—outage indicating—air gap separation of contacts—no cartridge burnouts—positive and accurate performance.

Write for Latest Bulletin

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO.

LAPP
Line Post
Insulators

Lapp Line Post Insulators eliminate radio interference due to both dirt and electro-static conditions.

Write for Bulletin No. 112 describing and cataloguing these insulators.

LAPP INSULATOR CO., Inc.
Le Roy, N. Y.

PROVIDENCE
INSULATED
WIRE CO.

Manufacturers of
Type AEIC
Service Entrance Cable

Concentrically wound bare neutral conductor, galvanized oval armor, weatherproof and flameproof finish.

For use on entrances without conduit.

Proof Against Theft of Current

Samples and prices on request.

PROVIDENCE
INSULATED WIRE CO.
PROVIDENCE, R. I.

McLAUGHLIN

For Telephone and Telegraph Lines.

GLASS INSULATORS

LOCUST
PINS

. . . . . Oak
Brackets
and Pole Steps
Safety—Strength
and Lasting Economy

LOCUST PIN CO., -- Front Royal, Va.

MAYDWELL & HARTZELL
INCORPORATED
FACTORY DISTRIBUTORS
LOS ANGELES SAN FRANCISCO

Oregon Commission Halts Copco Valuation

Formal closing of the investigation of the valuation and rates of The California Oregon Power Co., Medford, Ore., was effected through an order issued by Frank C. McColloch, state public utilities commissioner, April 10. The order found that "the continued expenditure of large sums of money for this investigation under present economic conditions is against the public interest." The investigation, which was not quite half completed, was begun by the present commissioner's predecessor, and had already cost the company $70,000 and the state $50,000.

Mr. McColloch had previously announced that the activities of his department would be largely devoted to completing those cases inherited from the previous administration that were nearly completed and that no new investigations of major character would be commenced at this time due to the continued stress of economic conditions. The principal uncompleted cases are two rate orders that had been taken to the court, one involving the Pacific Telephone & Telegraph Co. and one the Northwestern Electric Co., Portland. Investigation of the valuation and rates of the Mountain States Pawer Co., Albany, being well along toward completion, would be continued, Mr. McColloch said.

•

House of Magic For San Diego Exposition

Through joint arrangement between the Southern California Edison Co. and the General Electric distributors in California, the famous House of Magic which was a feature of the World's Fair at Chicago, will be brought to the California Pacific International Exposition opening this month at San Diego. The exhibit will be housed in the Palace of Electricity.

Several new and heretofore unexhibited features are to be added to this famous scientific electrical show. In addition to the House of Magic, the Southern California Edison Co., the General Electric Supply Corp., the George Belsey Co., Ltd., the George T. Bauder Co., and Electric Appliances, Inc., will have commercial exhibits of their own in the Palace of Electricity. The San Diego Consolidated Gas & Electric Co., Los Angeles Gas and Electric Corp. and General Cable Co. will be represented also.

•

• NePage-McKenny Co., 804 Sixth Avenue South, Seattle, has secured the contract for the replacement of the submarine cable for the Fourteenth Avenue South bridge. The cost is placed at $2,682.

P.G. & E. Arranges FHA Financing Through Bank

Recognizing the opportunities presented for the sale and installation of gas and electric consuming appliances and the financing of these sales through the modernization credit plan provided for in Title 1 of the National Housing Act, the Pacific Gas and Electric Co. has worked out a cooperative plan with the American Trust Co. and its branch banks located in various cities throughout northern California. Thus customers of the company who are home owners will be able to buy gas and electric appliances and pay for them on the terms authorized by the N.H.A.

The purchase plan will apply specifically to appliances and other equipment eligible for F.H.A. financing. This includes electric ranges, electric water heaters, major air heaters, refrigerators, air conditioning equipment, lighting fixtures and wiring, dairy sterilizers, electric steam boilers and washing and ironing machines if permanently attached.

The amount to be financed under this plan is limited to $35 minimum and $2,000 maximum, including the California sales tax. The plan calls for no down payment except as may be required by the bank in case of doubtful credit. The minimum monthly payment is not to be less than $3.00. Terms may run as long as 36 months.

An additional cooperative feature is that any firm or corporation regularly engaged in selling appliances which are eligible for financing and who is accepted by the American Trust Co. may participate in the provisions of the program.

An outstanding feature of the plan is that it is available in cities and towns in which there is no branch bank of the American Trust Co. In such cases the local Pacific Gas and Electric Co. office will act as agent for the bank, doing all of the necessary paper work and in addition collecting the monthly payment.

Officials of the company anticipate that this new financing program will materially increase appliance sales in P. G. & E. territory.

•

• To Develop More Industrial uses of electricity a special committee has been appointed in the Southern California Edison Co. to conduct research and make investigations looking toward the increased use of electricity through the development of new processes and applications. On this committee are Earl Doolittle, of the engineering department; George Hawley, of the commercial department; Frank Watkins, purchasing agent of the company.

New Smartness . . .
Styling . . . Salability

★COOK-A-DOR

L&H *Advanced*
ELECTRIC RANGES

TRIM, smooth-flowing lines . . . lustrous new color finishes enhanced by sparkling chrome trim. The kind of *eye appeal* that attracts feminine admiration. Warming Drawer, detachable ★Cook-a-dor or Handy Cooker are other important features that further the reputation of the L&H *'low service cost'* line.

L&H AirSpeed UNITS

Famous for their quick heat, evenly distributed. Patented, *exclusive* air-insulated design increases efficiency. Induced draft promotes *speed*. No other type of unit is faster or more economical.

The ★COOK-A-DOR

A complete six-quart electric cooker, *fully insulated* that uses little current. Mounted on inside of compartment door . . . *instantly* detachable. Handy Cooker is similar but fitted flush into the range cooking top.

Wire or Write for Complete Facts About the New L&H Line

A. J. LINDEMANN & HOVERSON CO.
613 W. Cleveland Ave., Milwaukee, Wis.
NEW YORK CHICAGO SAN FRANCISCO

...about the Trade

Weyerhaeuser Establishes Subsidiary For Poles

The Weyerhaeuser interests of Saint Paul have announced a segregation of their pole and piling activities from the Weyerhaeuser Sales Co., which organization has been a major factor in the sale and distribution of these products for many years. A new subsidiary, the Weyerhaeuser Pole Co., has been created with general sales offices in the Rand Tower, Minneapolis.

This new company will deal exclusively in the purchase, development, and distribution of poles, piling, and other round timber products—specializing in Western red cedar. It is expected that the principal—although not exclusive—source of supply will be the operations of affiliated Weyerhaeuser concerns in the West. It will also take over and continue the operation of the several Western red cedar yards and open tank butt-treating plants formerly owned by various Weyerhaeuser affiliated companies.

R. V. Clute, for the past five years manager of the pole and piling division of the Weyerhaeuser Sales Co., is vice-president and a director of the Weyerhaeuser Pole Co. and will be in charge of the general sales office in Minneapolis.

•

• DALLAS ENGINEERING CORP. of Dallas, Tex., manufacturers of fans, has announced the appointment of Detsch & Co., San Francisco, as representatives for Dallas fans in the states of California, Nevada and Arizona. Albert S. Knight, Seattle, Wash., has been appointed as representative for Washington, Oregon, Idaho, Montana and Utah. Sales will be directed strictly through jobbing channels.

•

• ASSOCIATED WHOLESALE ELECTRIC Co. 1111 Santee St., Los Angeles, has been appointed distributor of Atwater Kent radios for southern California, according to an announcement by C. C. Russell, president.

•

• TAPER TUBE POLE Co., San Francisco, has been appointed exclusive representative for northern California and northern Nevada for the lighting standards, poles, street identification markers and tariff signals of the Marbelite Corp. of America, Ltd., Los Angeles.

•

• JACK P. DAVIDSON, Pacific Coast Manager, the Estate Stove Co., has recently announced the removal of offices and display rooms from 1700 Santa Fe Ave. to 3625 South Grand Ave., Los Angeles.

• WESTERN SUPPLY Co., of Salt Lake City, Utah, was one of fourteen Crosley distributors awarded a bronze plaque for establishing outstanding sales records in their sales districts during last year.

•

• AMERICAN ELECTRIC SWITCH CORP., Minerva, Ohio, has announced the appointment of A. S. DeVeau Co., San Francisco, as its agent in central and northern California.

•

• R. D. WHITE, blind demonstrator of General Electric ironers, and his celebrated Seeing Eye dog "Wickee," was the feature speaker at the Electric Club of San Diego program recently. J. Frank Munro, of General Electric Supply Corp., presented the program.

•

• RUSS HUNTER ELECTRICAL SERVICE Co. has moved to a new store located at 302 South Market St., Inglewood, Calif., from a shop formerly located at 112 North Market St. The firm's slogan and feature of service is "Electrical Merchandise Repairing A Specialty."

•

• SIEVERS RADIO & ELECTRIC Sales & Service Co., of 503 Somerset Ave., Bellflower, Calif., has opened a branch store at 328 Downey Ave., Downey, Calif., featuring Grunow radios and refrigerators at both stores.

•

• FRIEND-CHRISTY ELECTRIC Co., of Santa Ana, Calif., recently moved to a new and attractive store at 217 North Broadway.

• MR. AND MRS. RUSSELL BRENNAN of Ventura, Calif., and formerly of Dixon, Calif., have purchased the Ojai Electric Co. at Ojai in Ventura county from D. V. Webster. The Brennan's for ten years were engaged in the electrical business in Dixon. Cecil Goar will continue to maintain his radio shop in the Ojai Electric Co. store. Mr. Webster has not announced his plans for the future.

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• LYMAN D. MORGAN, illuminating engineer, who represents the Pittsburgh Reflector Co., who has been located at 2013 Third Avenue, Seattle, for two years, has removed his offices to the Securities building in that city.

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• DISTRIBURION OF SPARTON refrigerators and radios in southern California will be handled by the Motor Rim & Wheel Service, 1367 So. Flower St., Los Angeles, according to an announcement from the Sparton factory.

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• CHANSLOR & LYONS, INC., have taken on the distribution for the entire state of California for Conlon washers and ironers and have placed them in distribution in many of the larger department stores, as well as carrying them in their own chain of automobile accessory stores.

•

• STERLING ELECTRIC MOTORS, INC., of Los Angeles, announces a factory branch office at San Francisco with headquarters in the Rialto Building. George A. Hindley is district manager.

COLT-NOARK

SWITCHES - MOTOR STARTERS - FUSES

The NEW
COLT-NOARK Combination
Pull-Out Type Switches

In the home entrance switch field, Colt-Noark's new line of "pull-out" type boxes is now ready. Advanced design, simple construction, with safety features that place them a step ahead of the field. Write for complete details.

QUADBREAK AND DUALBREAK TYPE A SAFETY SWITCHES
DUALBREAK AND NUBLADE TYPE C SAFETY SWITCHES
TYPE D SWITCHES
MOTOR STARTERS
METER SERVICE SWITCHES
COMBINATION RANGE AND ENTRANCE SWITCHES
RENEWABLE, INDICATING AND NON-INDICATING FUSES
FUSE ACCESSORIES
CAST IRON BOXES AND FITTINGS
LINE MATERIAL

PACIFIC COAST REPRESENTATIVE
H. B. SQUIRES COMPANY
San Francisco — Los Angeles — Seattle

COLT'S PATENT FIRE ARMS MFG., CO.
Electrical Division :: Hartford, Conn.

...about People

Jeff Alexander Resigns From Puget Sound Company

Jeff L. Alexander, for the last four years manager of the Central division of the Puget Sound Power & Light Co. with headquarters at Seattle, has resigned to accept the position of operating manager of the Twin City Rapid Transit Co., in Minneapolis and St. Paul.

Prior to coming to Seattle Mr. Alexander was president of the Houston Street Railway Co. and the Galveston-Houston Electric Railway Co. of Texas. While in the Northwest, Mr. Alexander was active in the affairs of the Seattle Chamber of Commerce and other civic bodies as well as in the Electric Club of Washington.

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• W. L. FROST, vice-president in charge of sales of the Southern California Edison Co. Ltd., has been elected a director of the company by the board of directors. Mr. Frost, a member of the Edison company organization since 1900, was elected to fill the vacancy caused by the recent resignation of C. A. Buffum, Long Beach merchant. Mr. Buffum resigned from the board because of his ill-health.

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• J. J. TOROK, formerly of the Westinghouse Electric & Manufacturing Co. has become associated with the research and development department of the Corning Glass Works. His new work will be concerned with Pyrex insulators and allied products.

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• SAMUEL B. MORRIS, chief engineer and general manager of the Pasadena Water Department for the past 22 years will relinquish his office to become Professor of Civil Engineering at Stanford University on September 1. M. S. Jones, assistant chief engineer and a member of the department since 1915, will succeed Mr. Morris as head of the Water Department.

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• HARRY B. KIRKLAND, director of the Uniform Legislation Department of the National Electrical Manufacturers' Association, has been appointed assistant to the managing director of that organization. Mr. Kirkland has many friends on the Pacific Coast as a result of his frequent visits in connection with code and ordinance activities.

•

• CHARLES E. NOLAN, of the Hawaiian Electric Co., Honolulu, is on a business trip to the mainland. He will sail from San Francisco late in May.

Harry Harper, who last year devoted so much time and energy to the highly successful operation of the Los Angeles Chamber of Commerce, for which he was president, says he is glad to be back at the nice, quiet job of Pacific Coast district managership of Graybar Electric Co., which during his strenuous year as Chamber of Commerce president he had to carry on likewise. Mr. Harper is the originator of the "Everyone's Self-Interest" idea as applied to the complete electrification of the home

•

• FRANK MCGINLEY, popular electrical contractor of Wilmington, Calif., and former president of the southern California association of electrical contractors, has been made chief engineer of the police and fire alarm signal division for the city of Los Angeles. In this position he will have charge of all traffic and fire alarm signal systems in the city. To accept this position he resigned from the Building and Safety Commission upon which he has served for a good many years.

•

• CARL ERNST, for a number of years assistant district manager in the Imperial Valley for The Southern Sierras Power Co., has been promoted to the position of district manager in charge of all business in the state of Nevada of The Nevada-California Power Co. and associated companies. Joe E. King, for whom he was assistant, both working out of the office of the company at El Centro, continues as district manager of the power company in the Imperial Valley. Mr. Ernst came to Imperial Valley in March, 1927, as superintendent at Calexico and a year later was made assistant district manager.

•

• R. H. MANAHAN, chief of the department of electricity, Los Angeles, attended the national meeting of the electrical committee, National Fire Prevention Assn. in New York City last month. This is the committee which considers revisions proposed for the National Electrical Code.

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Three Californians Win Coffin Fellowships

Three California students have been awarded college fellowships to carry on research investigation under the Charles A. Coffin Foundation, established by the General Electric Co. Included among these fellowships awarded are Lyman R. Fink, Corona; L. Jackson Laslett, Pasadena; and Arnold B. Steiner, San Francisco.

Experimental synchronous machine analysis will be studied by Mr. Fink at the University of California where he is now working for his doctor's degree in electrical engineering. Investigations of the absorption in matter of high-energy gamma rays, particularly those arising from the production of electrons and positrons will be the basis for work for a Ph.D. at the University of California by Mr. Laslett. Mr. Steiner will work at Stanford University on a quantitative investigation of gaseous photo-chemical reactions in the Schumann region. His fellowship is a renewal of a Coffin award granted last year.

•

• W. B. MacDonald, manager of the Kalispell, Mont., divisions of Mountain States Power Co., died in Portland, Ore., at the age of 71, March 5, after several months' illness caused by heart trouble. Mr. MacDonald was a pioneer in electrical development, numbering among his many pioneer installations that of the 1893 World's Fair in Chicago.

•

• Wm. G. Bonelli, Los Angeles attorney and teacher, was appointed by Governor Frank F. Merriam to succeed Col. Carlos W. Huntington who resigned as Director of Professional and Vocational Standards, and Registrar of Contractors for the State of California. Col. Carlos W. Huntington became president of Chemical Products, Inc., of California, at Culver City.

•

• George Hawley, industrial heating engineer for Southern California Edison Co. Ltd., has been placed in charge of commercial cooking as well as industrial heating, according to R. A. McFadden, manager of power sales.

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• R. C. Bragg, of the Alca Electric Co., Vallejo, Calif., has been named rancher and director of the Westinghouse Quota Busters Club, an organization of star refrigerator salesmen from all over the country. Nine officers are named each year as a result of the sales records made in the preceding year. Admittance is based on performance against quota. The position won by Mr. Bragg is the highest in the organization.

• Fred Mulvaney, it was announced by Al Meyer, president of the Leo J. Meyberg Co., joined the sales staff of that organization in its San Francisco office on April 1. Mr. Mulvaney will have charge of sales promotion and the development work in connection with the introduction of the new Norge ranges as well as other products handled by the distribtutor. Mr. Mulvaney has had wide contact with the field in his former connection with the RCA Radiotron organization and with the General Electric Supply Co., with which he has been associated in the past for many years. Some months ago he resigned from the General Electric Supply Co. to join the Fred Rae Advertising Agency in San Francisco from which he was taken by Mr. Meyer.

•

• Asa K. Gaylor, electric heating engineer, has joined the Portland General Electric Co. For the last nine years he has been electric heating engineer for Northwestern Electric Co., of Portland. D. O. Bergey, heating engineer, has been assigned the work of handling heating and air conditioning for Northwestern Co.

•

• B. G. Brown has started a new electrical store in Ridgefield, Ore. Its wiring department is now being managed by Harold Bradshaw, formerly of Northwestern Electric Co. Northwestern Electric Co. has made the Brown store its local station for the paying of bills, thus bringing local customers to the store where they may see the latest in electrical appliances.

•

Rumpty Poozles

Spring time is initiation time for Bill Frampton's Rumpty Poozles. Captured for the ceremonial are the two long haired boys in the center, left J. P. Robinson, Kerite Insulated Wire & Cable Co., and N. B. Hinson, chief engineer of the Southern California Edison Co. Officiators, in the white caps and aprons, from left to right are A. M. Blecksmith, Duncan Electric Co.; F. S. Reynolds, Southern California Edison Co.; Bill Frampton, Southern California Edison Co., and W. F. Grimes, Radio Interference Bureau of Los Angeles

• Walter B. McMacking, formerly city wiring inspector at Victoria, B. C., has been appointed city electrician. Mr. McMacking replaces Matthew Hutchison who is retiring after forty-five years as head of the department.

Every inefficient range on your lines means a possible lost customer for cooking load. Protect your service by modernizing those old ranges. Install

CHROMALOX

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Edison Bldg. Los Angeles

...in New Equipment

Electro-Graphitic Brushes

Designed especially for service on heavy-duty, direct-current equipment, a new series of electro-graphitic brushes for use with direct-current generators, motors and rotary converters has been announced by the Carbon Sales Division of the National Carbon Co., Cleveland, Ohio. Products of a four-year program of research, the new series of brushes are stated to include combinations of material to meet the fundamental physical properties essential to satisfactory brush performance on heavy-duty, direct-current equipment. Known as the "SA" series, the line consists of five grades having a progressive relationship with respect to commutating and mechanical characteristics.

●

New Cabinet Type Standard Range

The Standard Electric Stove Co., Toledo, Ohio, has just announced a new four-burner, cabinet base electric range, known as Model 1445 CAB. Oven size is 16x18x14. The range is equipped with either open or enclosed surface units. It has a recessed switch panel and the cabinet has two utensil drawers on roller bearings. The range is completely automatic and a range light is a standard feature.

●

Combination Switch and Night Light

A night light combination to be installed as a replacement unit in existing switchboxes has been perfected by Pass & Seymour, Inc., Syracuse, N. Y. Due to a novel wiring hook-up, one switch (either single-pole or three-way) replaces the existing switch. A second single-pole switch controls the night light. This new wiring device is described in Booklet No. 2097.

●

Kelvinator 1935 Air Conditioning Line

Sixty-three units, designed to meet every need from individual room conditioning to large theater and auditorium installations, make up the complete Kelvinator air conditioning line for 1935. Included are seven self-contained cabinet type units for offices, small shops and residence rooms. Other new items are four suspended type units equipped with temperature control and especially designed for installations where ceiling or recess location is desirable. Nine air cooled and thirteen water cooled condensing units with capacities ranging from one-third to 20 hp. make up that portion of the line. In addition there are fifteen evaporator coils for duct installation, ranging in capacity from one to 20 tons.

●

Weston Photronic Illumination Control

For maintaining a predetermined level of illumination regardless of the time of day, a new illumination control relay for both indoor and outdoor use has been announced by the Weston Electrical Instrument Corp., Newark, N. J. Operation of the new device is determined by the intensity of the natural light available, and not by time or the eye sensations of the operator. A photronic cell is used as the controlling element for the relay. It turns lights on at levels of natural light intensity which is insufficient for the indoor worker or dangerous to outdoor traffic conditions. When natural light returns to adequate level, the lights are automatically turned off.

New Crawford Ranges Announced

Two new electric ranges designed particularly to meet the demands of low cost ranges for volume selling have been announced by Walker & Pratt Manufacturing Co., Boston, Mass. The ranges are identical in size and equipment except that one has three surface units and the other four. The three-unit range is a T.V.A. model which will retail under $80 and the four-unit model under $100. They are finished in ivory porcelain enamel with baked lacquer legs. They have a 16 in. oven and are equipped with Hilo toggle switches.

●

G.E. Conduit Products Improvements

Three improvements have been announced in the line of conduit products manufactured by the merchandising department of the General Electric Co., Bridgeport, Conn. All G. E. couplings, including small sizes now are beveled at both ends to permit easy starting of the conduit on the coupling and to save time in installation. Threads on G.E. "White" conduit are now hot-dipped, galvanized and Glyptal-coated. Thread protectors are now placed on all sizes of G.E. conduit to prevent threads from being damaged in transit.

●

New Model Ranges

New models of the Detroit Electric Star Range for 1935 have been announced by the Detroit Vapor Stove Co., Detroit, Mich. Model No. 5760 has a 16x13x19¼ in. oven. Standard equipment includes for open-type top elements, one of 2,000 watts, two of 1,200 watts and one of 660 watts, which is connected for automatic clock control. Type of elements are optional at a slight increase in cost. One 2,800 watt element serves both oven and broiler. The range is available in a variety of colors. Model No. 5761 is equipped with a built-in measured time clock and chrome finished range light. Model No. 5764 is full automatic.

Hotpoint Announces Four New Ranges

Four new models are included in the 1935 line of Hotpoint electric ranges, according to announcement by the Edison General Electric Appliance Co., Chicago, Ill. The new models have distinct style appeal and also incorporate new interior features. The model pictured is known as RA19 "Treasure" and has a body of steel welded into one piece. Equipment includes new Hi-lo quick snap tumbler switches; direct acting bulb type oven temperature control with dial regulator and pilot light; semi-extension type sliding oven shelves and textolite door and drawer handles. Model RA20 known as "Marvel" is a three surface unit, table-top design. Model RA152 is a four-unit conventional cabinet type. Model RA86 known as "Mayfair" is a table-top model with five surface units and Thrift Cooker. This new range with flush straight sides and back is designed for the modern built-in kitchen.

●

Demonstation Kit for Home Lighting Sales

Selling light in the home has been made simpler through the facilities of a new demonstration kit announced by the Westinghouse Lamp Co., New York. Known as the Varilight, the kit makes possible variation in illumination over a wide range of intensities without changing lamps. The equipment includes a variable transformer containing a switch-panel resembling a radio dial, together with two photoflood lamps and a light meter. By substituting a photoflood lamp for the one in the customer's favorite reading lamp, it is possible with the kit to vary the intensity of light by turning the dial regulating the variable transformer.

●

New Switch Line

Production of a new line of Colt-Noark type C safety switches up to 575 volt has been announced by Colt's Patent Fire Arms Manufacturing Co., Hartford, Conn. The new models incorporate the advanced dual break switching principle patterned after the "Quadbreak" design. The new models utilize the sliding switching member which causes each leg of the circuit to be broken at two points instead of one. The arc is thus greatly reduced, increasing the safety of operation and prolonging the life of the switch. Removable unit blocks, a redesigned cabinet and a new type handle are other features of this switch.

●

Seep-Proof Bushings

Bushings for lower distribution voltages which are both seep-proof and gas-tight, has been announced by the Ohio Brass Co., Mansfield, Ohio. Oil seepage of dry type bushings on conservator-type transformers has been a problem in bushing construction which has never been solved to the entire satisfaction of users. In the new Class R bushings recently designed by this company, this problem is solved by the use of a new method of assembly at the flange line of the bushing and by the use of a bronze insert at the top of the bushing which is ground to a true flat surface. A cork gasket which is held in constant compression between the lower porcelain weather-shed and metal mounting flange, makes this bushing both seep-proof and gas-tight.

●

Solderless Lug

Simplicity is claimed to be the greatest feature of a new solderless lug just announced by Ilsco Copper Tube & Products, Inc., Cincinnati, Ohio. The lug is available in different sizes and styles. A screw driver, wrench, or pliers is all that is necessary to attach any wire to the connector.

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"SA" Series

ELECTRO-GRAPHITIC BRUSHES
FOR
HEAVY DUTY D. C. SERVICE

The grades of the "SA" Series are indexed primarily on the basis of commutating properties

For more severe commutating conditions select grades of higher numerical index.
NCC SA-45
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NCC SA-30
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EVERY BRUSH THE SAME IN PHYSICAL PROPERTIES AND PERFORMANCE

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General Elec. Co.
Graybar Elec. Co., Inc.

Anchors, Guy
James R. Kearney Corp.

Appliances, Household
Apex Rotarex Mfg. Co.
Edison Gen. Elec. Appliance Co., Inc.
General Elec. Co.
General Elec. Supply Corp.
Graybar Elec. Co., Inc.
Lindemann & Hoverson Co., A. J.
Malleable Iron Range Co.
Mary Dowd Reardon Studios Ltd.
Swartzbaugh Mfg. Co.
Westinghouse Elec. Supply Co.

Boxes
General Cable Corp.
General Elec. Co.
Russell & Stoll Co.

Brackets, Wood
Locust Pin Co.

Bus Fittings
Burndy Eng'g Co.
General Elec. Co.

Buses
Aluminum Co. of America ..

Cable Accessories
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General Elec. Co.
John A. Roebling's Sons Co.

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American Steel & Wire Co.
Columbia Steel Co.
Crucible Steel Co. of America
General Cable Corp.
General Elec. Co.
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Maydwell & Hartzell, Inc.
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Central Station Equipment
Tom Wood

Chimes
Square D Co., Inc.

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Westinghouse Elec. & Mfg. Co.

Cleaners, Vacuum
Apex Rotarex Mfg. Co.
Clements Mfg. Co.
Cramer Elec. Co.

Coil Winding
Jeffries Transformer Co.

Compounds, Insulating
John C. Dolph Co.
General Cable Corp.
General Elec. Co.

Condensers, Electric
Allis-Chalmers Mfg. Co.
J. G. Corrin
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Conduit
Aluminum Co. of America
General Elec. Co.
Youngstown Sheet & Tube Co.

Conduit, Underground
Fire Proof Wall Co.
Johns-Manville Corp.

Connectors
Burndy Eng'g Co.
James R. Kearney Corp.

Cutouts
James R. Kearney Corp.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Demand Control
General Elec. Co.
Wesix, Inc.

Distribution Specialties
General Elec. Co.
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W. N. Matthews Corp.
Maydwell & Hartzell, Inc.
St. Louis Malleable Casting Co.

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John A. Roebling's Sons Co.
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Trico Fuse Mfg. Co.

Gasoline
Union Oil Co.

Generators
Allis-Chalmers Mfg. Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Graphite Products
National Carbon Co., Inc.

Ground Rods
Crucible Steel Co.
Maydwell & Hartzell, Inc.

Heaters, Air
Edison Gen. Elec. Appliance Co.
Montgomery Bros.
Noblitt-Sparks Industries, Inc.
Sandoval Sales Co.
Thermador Elec'l Mfg. Co.
Wesix Inc.
Edw. L. Wiegand Co.

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Lindemann & Hoverson Co., A. J.
Malleable Iron Range Co.
Sandoval Sales Co.
Thermador Elec'l Mfg. Co.
Wesix Inc.
Westinghouse Elec. & Mfg. Co.

Heating Element—Repair Part
Mend-It Sleeve Mfg. Co.
Edw. L. Wiegand Co.

Illuminating Glassware
Inland Glass Works, Inc.

Instruments, Measuring and Recording
The Bristol Co.
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Weston Elec'l. Instrument Corp.

Public Utilities
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Idaho Power Co.
Mountain States Power Co.
Northwestern Electric Co.
Pacific Gas and Electric Co.
Pacific Power & Light Co.
Portland General Electric Co.
Puget Sound Power & Light Co.
San Joaquin Light & Power Corp.
Southern California Edison Co., L
Southern California Edison Co. Ltd.
Utah Power & Light Co.
Washington Water Power Co.

Pumps
Pelton Water Wheel Co.

Range Units
Edison Gen. Elec. Appliance Co.
L. W. Thompson
Edwin L. Wiegand Co.

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Graybar Elec. Co., Inc.
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Illinois Elec. Porcelain Co.
Lapp Insulator Co., Inc.
Locke Insulator Corp.
McLaughlin Glass Co.
Owens-Illinois Glass Co.
Westinghouse Elec. & Mfg. Co.

Ironers
Apex Rotarex Mfg. Co.
General Elec. Co.
Ironite Ironer Co.
Mary Dowd Reardon Studios
Savage Distributing Co.
Gordon E. Wilkins

Lamps, Mazda
General Elec. Co.
Westinghouse Lamp Co.

Lamps, Sun
General Elec. Co.

Lighting Equipment
Smoot-Holman Co.
Wuelker Reflector Lighting Corp.

Line Material
Maydwell & Hartzell, Inc.

Meters
The Bristol Co.
General Elec. Co.
L. A. Nott
Sangamo Elec. Co.
Westinghouse Elec. & Mfg. Co.
Weston Elec'l Instrument Corp.

Molded Material
C. D. La Moree

Motors
Allis-Chalmers Mfg. Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.

Motor Starters
Allis-Chalmers Mfg. Co.
General Elec. Co.
Ward Leonard Elec. Co.
Westinghouse Elec. & Mfg. Co.

Oil, Lubricating
Union Oil Co.

Oil, Transformer & Switch
General Elec. Co.
Union Oil Co.

Panel Boards
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Westinghouse Elec. & Mfg. Co.

Photoelectric Cells
General Elec. Co.
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Pins, Wood
Locust Pin Co.

Pole Line Hardware
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Graybar Electric Co., Inc.
Hubbard & Company
Joslyn Co. of Calif.
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Locke Insulator Corp.
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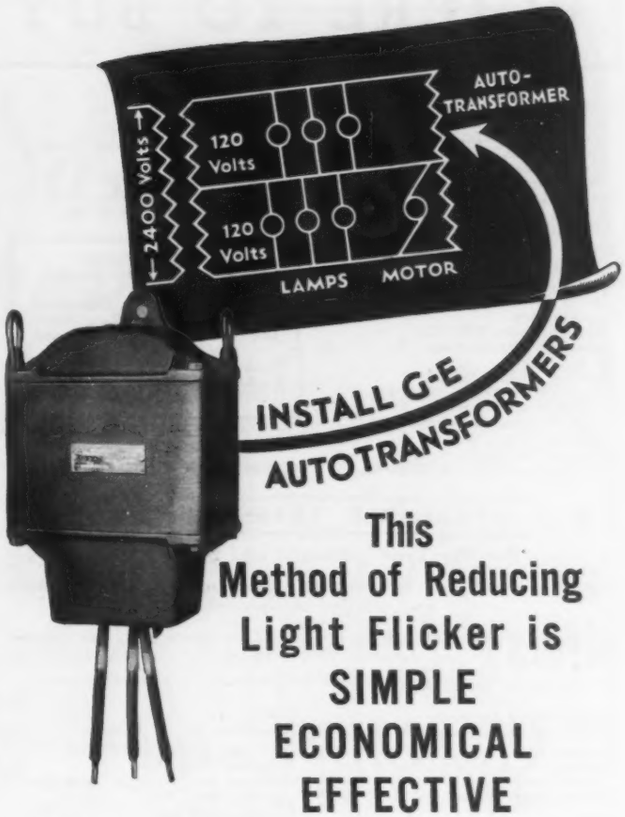
Parker Elec'l Mfg. Corp.
Square D Co., Inc.

Switches, Time
R. W. Cramer & Co.
General Elec. Co.
Sangamo Elec. Co.
Tork Clocks, Inc.



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We have available two publications which describe this method of reducing light flicker in more detail. For copies, simply mail the attached coupon.

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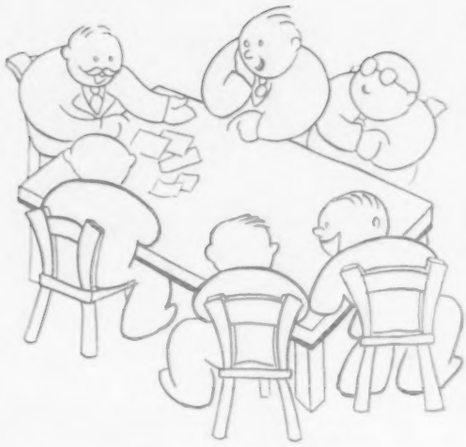
So we got our heads together



Round the table...our Monday morning meeting...mapping out bigger and better plans for "Bargain Price Electricity"...more advertising...more publicity...more this...more that...and then someone remembered...what about the retail dealer?

Aren't we forgetting him?...after all, the main idea is to help him sell appliances...why stop the campaign outside his door?...why not bring it **inside**, where he can use it?... let's give more thought to tying the dealer in ...that's our next step.

So we got our heads together...the man was right...it's up to us to make shoppers think of "Bargain Price Electricity" whenever they see appliances on display...but what kind of sales-helps will do the trick...what does the dealer want?

DEALERS were asked how "Bargain Price Electricity" could be put to work on their sales floors. We offered to supply whatever materials were needed. Here's what they said: 1—A KEY-LINE to identify retail advertisements and displays, such as "Electricity at Bargain Prices—Ask Our Salesmen." 2—NEWSPAPER MATS of this line in various styles and sizes. 3—DISPLAY CARDS to dress up windows and floors. 4—PRIMER CARDS to explain and illustrate the savings. 5—LITERATURE to carry the story home. 6—SPECIAL PRICE TAGS to remind price-lookers of bargain electricity. All these suggestions were followed. The material is all ready. And it's all FREE!

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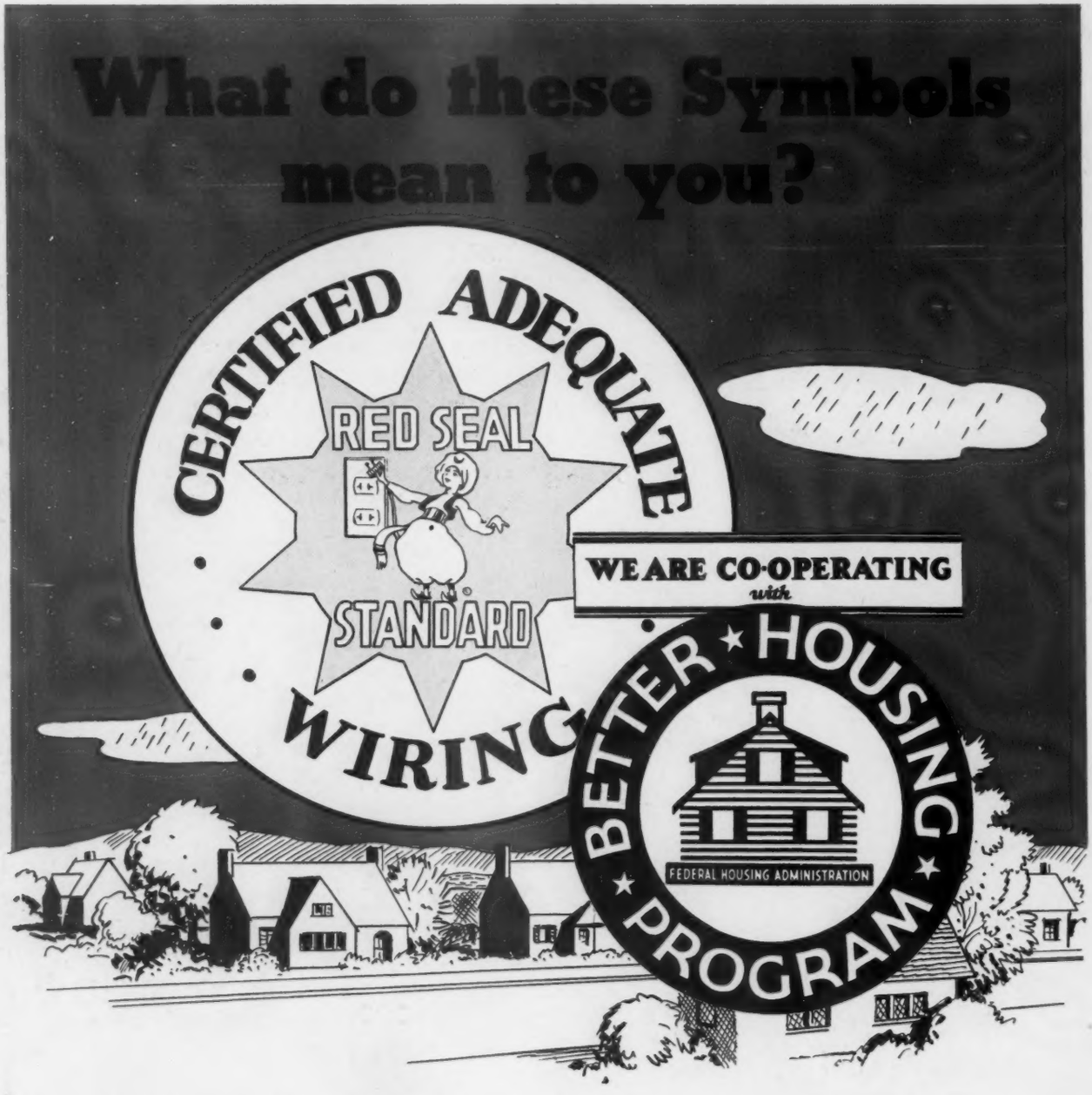

Are you taking advantage of the facilities represented by these two symbols?

Both of these symbols mean an opportunity for more business for you. The Red Seal Plan means an adequate wiring job resulting in increased profits to contractor, dealer, wholesaler, and utilities.

The Federal Housing Administration makes available to the prospective home owner the funds necessary for new residential construction. Loans up to $16,000 amortized over a 20 year period are now available through the usual lending agencies.

Regardless of the branch of the industry to which you belong, you are an integral unit in the industry. The advertising campaign of this Bureau is designed to assist the entire electrical business in pointing out to *your* prospective customers the advantages of Red Seal Wiring, and Better Light-Better Sight. Much publicity has been given the Federal Housing Administration activities—all reacting to your benefit.

A united industry, taking advantage of these promotional activities will benefit their customers as well as themselves. "The Way of To-day is the Electric Way."

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